the Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY • SEPTEMBER 8, 1955

Boost output, cut costs with better plant lighting
See page 27

How we protect the good name of 15,000 people

EACH of the 15,000 men and women working for the Timken Company has a special skill for doing his job. And together they've built a reputation for producing the finest-quality tapered roller bearings, alloy steel bars and billets, seamless steel tubing and removable rock bits.

The trade-mark "Timken" helps us protect this reputation. It identifies the products made by the Timken Company. And this legal identification protects *your* reputation as well as ours. By specifying "Timken" you can always be sure of the high quality you've come to expect from products of the Timken Company. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TAPERED ROLLER BEARINGS • REMOVABLE ROCK BITS • FINE ALLOY STEELS

Chromel-Alumel

THERMOCOUPLE ALLOYS

- **FOR ACCURACY!** Thermocouples made of Chromel-Alumel are unconditionally guaranteed to register true temperature-e.m.f. values within extremely close specified limits . . . ±4°F. from 0° to 530° F.; ±¾% at operating temperatures from 531° to 2300°F.

- **FOR DURABILITY!** Both Chromel and Alumel are highly resistant to oxidation, sensitive to temperature fluctuations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal thermocouple materials known.

- **FOR ECONOMY!** In spite of their finer degree of accuracy, their higher temperature range and longer useful life, Chromel-Alumel thermocouple wire costs the user no more than ordinary base metal materials . . . and in many cases, they actually cost less!

Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

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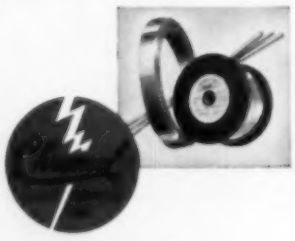
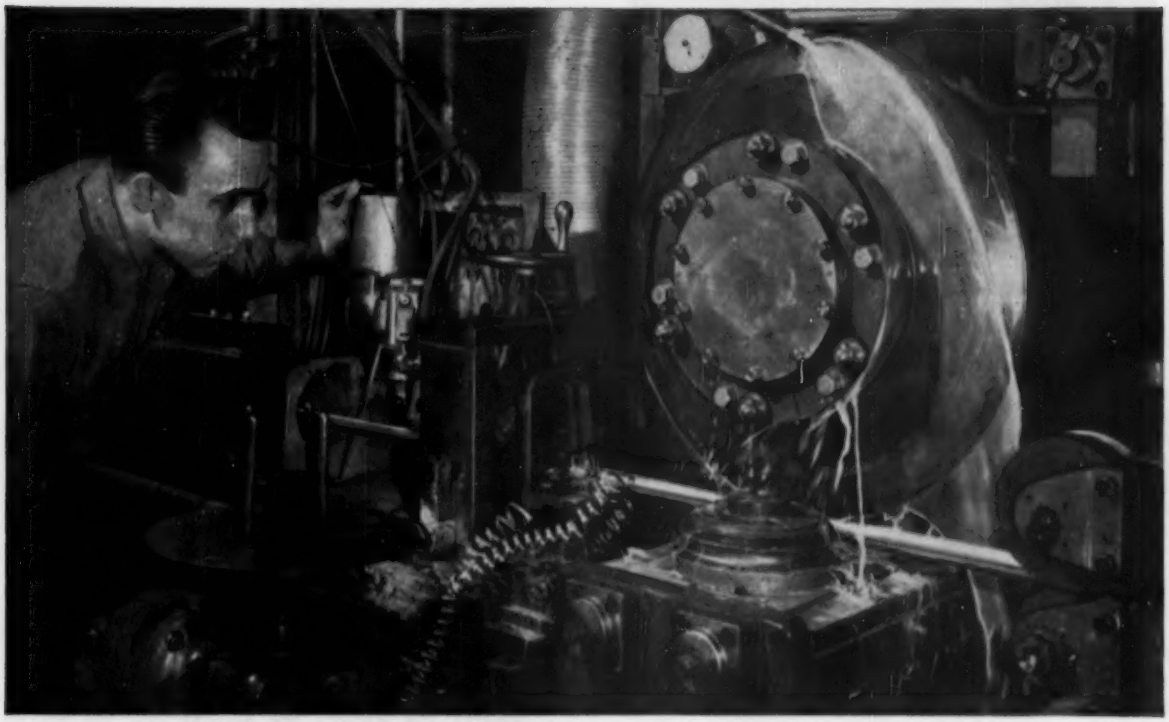
Ask for them by name!

Your instrument manufacturer or pyrometer service company can supply your immediate requirements . . . so specify them by name. "Chromel-Alumel" thermocouples . . . trade names you can trust!





Excess weld metal spirals off formed tubing after seam is butt-welded. Nodulizing gun under operator's left hand then applies spelter coat over seam weld, following which tubing is cooled and sheared to desired length.

Tubing made from galvanized sheet

Bethcon galvanized sheet passes in continuous ribbon through forming mill at Welded Tube Company of America plant in Philadelphia.

This tubing is formed from galvanized coils, and it's such a hot item today because it is strong yet light and inexpensive. Typical uses: TV antenna masts, clothes poles, fence posts, playground equipment.

Tubing is one of several interesting new applications of galvanized steel made possible by the continuous galvanizing process. This method bonds the zinc much more tightly than conventional hot-dipping, and makes the finished steel available in long coils, rather than cut lengths only. It is one of the reasons why our galvanized steel volume has swelled tremendously in the last four years.

But the fabrication of galvanized steel sheets in these new uses is of course only one of dozens of lines of manufacturing whose consumption of Bethlehem sheets has increased enormously in the past few years. Put them all together, and add the continuing needs of long-time big users, and it's easy to see why Bethlehem is being called on to produce more hot-rolled and cold-rolled sheets than ever before.

We are doing just that. Our sheet mills at Lackawanna and Sparrows Point are turning out sheets at a record pace. Early this year we set a new all-time production high. The next month we topped even that. And we're continuing hard at it until production and consumption come into line.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

The Iron Age

DIGEST OF THE WEEK

Starred items are digested at the right

EDITORIAL

Is There Enough Steel Capacity? 7

NEWS OF INDUSTRY

*Special Report: How Good Lighting Cuts Costs 27
*International: Pipe for Canadian Gas, Oil 29
*Disaster: What Happens After a Flood 30
*Marketing: More Products Go into Metal Tubes 32
*Government: Tax Cuts Loom as Revenues Boom 33
*Manufacturing: Ceramics and Metalworking ... 35
Industrial Briefs 42
Personnel: Iron Age Salutes 57
Iron Age Introduces 59
Clearing House 146

NEWS ANALYSIS

Newsfront 25
Report to Management 41
*Automotive Assembly Line 44
This Week in Washington 49
*West Coast Report 53
*Machine Tool High Spots 55

TECHNICAL ARTICLES

*How to Forge High Temperature Alloys 67
*Pros and Cons of Carbon Restoration 71
*Type 329 is Good Corrosion Resistor 74
*Plastisols: Handy, Low Cost Coatings 77
*Resistance Welding Simplifies Presswork 80
Handling Device Speeds Quenching 82
Technical Briefs 92

MARKETS & PRICES

*The Iron Age Summary—Steel Outlook 127
*Steel Product Markets 128
Comparison of Prices 129
Iron and Steel Scrap Markets 130
Nonferrous Markets 134
Steel Prices 137

REGULAR DEPARTMENTS

Dear Editor 9
Fatigue Cracks 11
Dates to Remember 13
Free Literature 84
New Equipment 118

INDEX OF ADVERTISERS 153

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NEWS DEVELOPMENTS

GOOD LIGHTING MEANS CASH SAVINGS — P. 27
Most plant lighting is outmoded and couldn't meet established standards. Improved illumination of plant areas can mean big savings. Ford Chicago plant saves $374,000 a year in maintenance. Worker morale is improved, scrap and accidents cut under good lighting plans. New systems cost less to operate, but provide much more illumination for work.

HOW ONE COMPANY FIGHTS BACK AFTER FLOOD—P. 30
Chase Brass & Copper Co., Waterbury, Conn. was right in the middle of the flood path. The company was hard hit but is wasting no time complaining about it. Executives and workers are pitching into the job of cleaning and repairing. Equipment is being stripped down. A complete rewiring job is in progress. Layers of silt are being shoveled away.

BUDGET PROSPECTS STIR TAX CUT CLAMOR — P. 33
Booming revenues have brought the federal budget close to the break-even point. Both parties are rushing to get in on tax cut legislation. With elections coming up, slashes will probably go where the votes are. Individual levies figure to come down. Business can expect little relief.

AN ANCIENT ART AIDS MODERN METALWORKING—P. 35
Working with ceramics, long considered an art generally associated with jewelry, is now becoming a business aimed at protection of metals from elevated temperatures, wear, corrosion and oxidation. In the foreground of the research are Armour and Batelle who reveal two, more efficient, newly devised techniques.

NEW AUTOMAKER BUILDS SMART SPORTS CAR—P. 44
Dual Motors builds sports car for market. Body will be constructed in Italy, chassis shipped there for assembly. Car will feature souped-up Dodge V-8 engine. New models will feature added safety features. Must conform with some state laws making construction fit possible belt installation.

TOOL MOBILIZATION PROGRAM TAKES SHAPE—P. 55
A program that will permit rapid tooling up to wartime levels is moving into final stages. Machine tools for leasing purposes number 2744; elephant tools stockpiled are only one short of a 309 unit goal. ODM is readying machinery that would set the whole tooling and production program in motion if attack comes.

IN METALWORKING

ENGINEERING & PRODUCTION

HOW TO FORGE HIGH TEMPERATURE ALLOYS — P. 67
Good forging results can be attained with high temperature alloys using correct temperature control and proper production rates and methods. High alloy forgings may solve problems for design engineers working on these applications. Methods used show promise forgings can be made on a production basis.

PROS AND CONS OF CARBON RESTORATION — P. 71
Carbon restoration is getting universal attention because it can mean extra dollars. It can reduce machining, salvage scrap and improve a borderline product. Its success depends mainly upon control and equipment. But the type steel restored may affect the end-result. This raises the question: "Does carbon restoration have its limitations?"

TYPE 329 IS GOOD CORROSION RESISTOR — P. 74
Largely overlooked by American fabricators, low nickel Type 329 may sometimes be substituted for Type 316. Nitric acid corrosion rates are as low as those for Type 304. These and other advantages are spelled out for an alloy every fabricator should know more about.

PLASTISOLS: HANDY, LOW COST COATINGS — P. 77
Introduced just 8 years ago as economical protective coatings for electroplating racks, plastisols are now applied to a wide range of metal products. They form dense, tough, flexible coatings; can be compounded to varying degrees of hardness or to resist particular corrosive conditions. In colored form they improve product appearance.

RESISTANCE WELDING SIMPLIFIES PRESSWORK—P. 80
To produce quality washing machine tubs with speed and economy, Whirlpool Corp. makes extensive use of automatic seam welders. Welding tub walls and bottoms eliminates deep-drawing operations. Blanking parts to required size saves sheet steel. Brushing machines clean all welds before tubs are enameled.

MARKETS & PRICES

GAS, OIL CREATE BIG CANADIAN PIPE NEED — P. 29
Canada will need miles of pipe for booming oil and gas fields. Electricweld, seamless linepipe, drill pipe, casing and equipment must all be provided for current or planned projects. The country is expanding pipe production but right now the largest size rolled is 16 in. Anything bigger must be imported. Last year, Canada's oil, gas and water industries imported $17 million worth of casing alone.

TUBES: SQUEEZE MORE THAN TOOTHPASTE — P. 32
Mr. & Mrs. American's demand for convenience in most of the retail items they purchase is giving new impetus to the collapsible metal tube industry. Packaging executives are putting such items as jellies, putty and paint colorants into tubes and are researching the possibility for meat spreads, condiments and just about anything that can be made a paste.

NEW WORK FILLS WEST COAST SHIPYARDS — P. 53
Navy, commercial building and conversion give new life to West Coast's silent shipyards. Plans include construction of missile launchers, aircraft carrier conversion and nuclear powered submarine. Private line plans installation of anti-roll stabilizers for liners.

TIGHT STEEL MARKET FACES FALL UPSURGE — P. 127
With the market about as tight as it has ever been, steel users and producers face more trouble in the months ahead. Following a summer "lull" that was more like a boom, consumers are coming in at a terrific pace in their bid for steel products that in some cases are urgently needed to avoid a slowdown.

STEEL PRODUCT OUTLOOK STILL TOUGH — P. 128
Heavy carryovers into 1956 loom for most steel products. Mills have slashed allotments in effort to reduce backlogs. Sheets, plate, and structurals are tightest items. Warehouse situation is worsening due to strong demand and slowing of mill deliveries. Consumers having no luck trying to place first quarter orders.

NEXT WEEK:

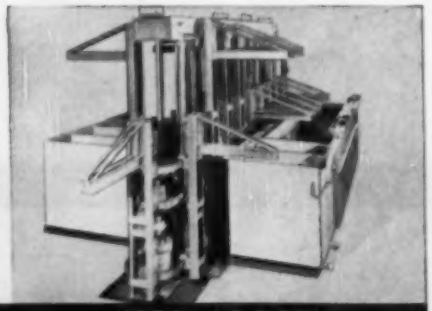
STRESS ANALYSIS PREVIEWS PRODUCT PERFORMANCE
Whether you make lawnmowers or locomotives—whatever your product—modern stress-analysis techniques might show you how to build it more economically and make it serve your customers more dependably. A stress-analysis program at Ford Tractor Div. resulted in a much-improved hay rake design.

WHAT'S REALLY BEHIND THE COPPER PRICE RISE?
Is Chilean Government pressure a major factor in recent copper price increases? What other factors are involved. Will higher prices force users to turn to substitute materials? What about the long-term outlook on this metal? These and other questions will be answered in next week's special report on copper.

AUTOMATION

Low initial and low operating costs are features of this newly introduced small automatic which has a big capacity for its size.

"LITTLE STEVE"
Rack Type Machine

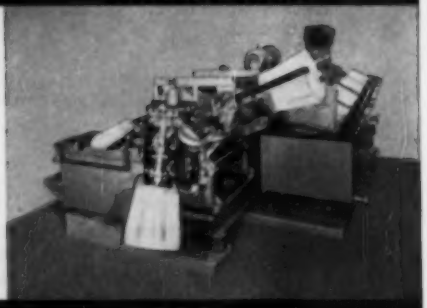


Unit's load capacity, mechanical flexibility and lift design meet tomorrow's increased safety and production requirements.

"STEVADOER"
Rack Type Machine

A compact automatic processing machine, embodying the famous Stevens auxiliary cam shaft and lifters for rapid vertical transfer.

MODEL "A"
Rack Type Machine

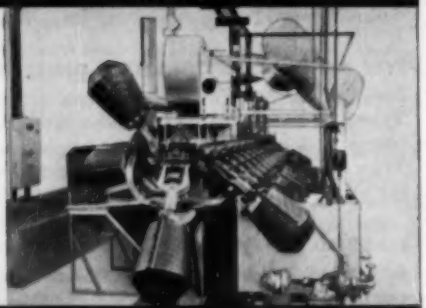


A proven automatic barrel machine for plating and processing small parts. Only unit with fully automatic load and unload features.

MODEL "C"
Barrel Type Machine

Features rapid, continuous movement processing employing hump type cams. Design permits utmost mechanical and cycle flexibility.

MODEL "B"
Rack Type Machine



Large capacity automatic barrel unit for volume production. Embodies major features of the famous Stevens Model "C" machine.

"SUPER E"
Barrel Type Machine

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Why not see how one of Stevens great family of automatics can be engineered for your metal finishing operations? Call in a Stevens Sales Engineer today or write direct to –

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AUTOMATION IN THE CORE ROOM

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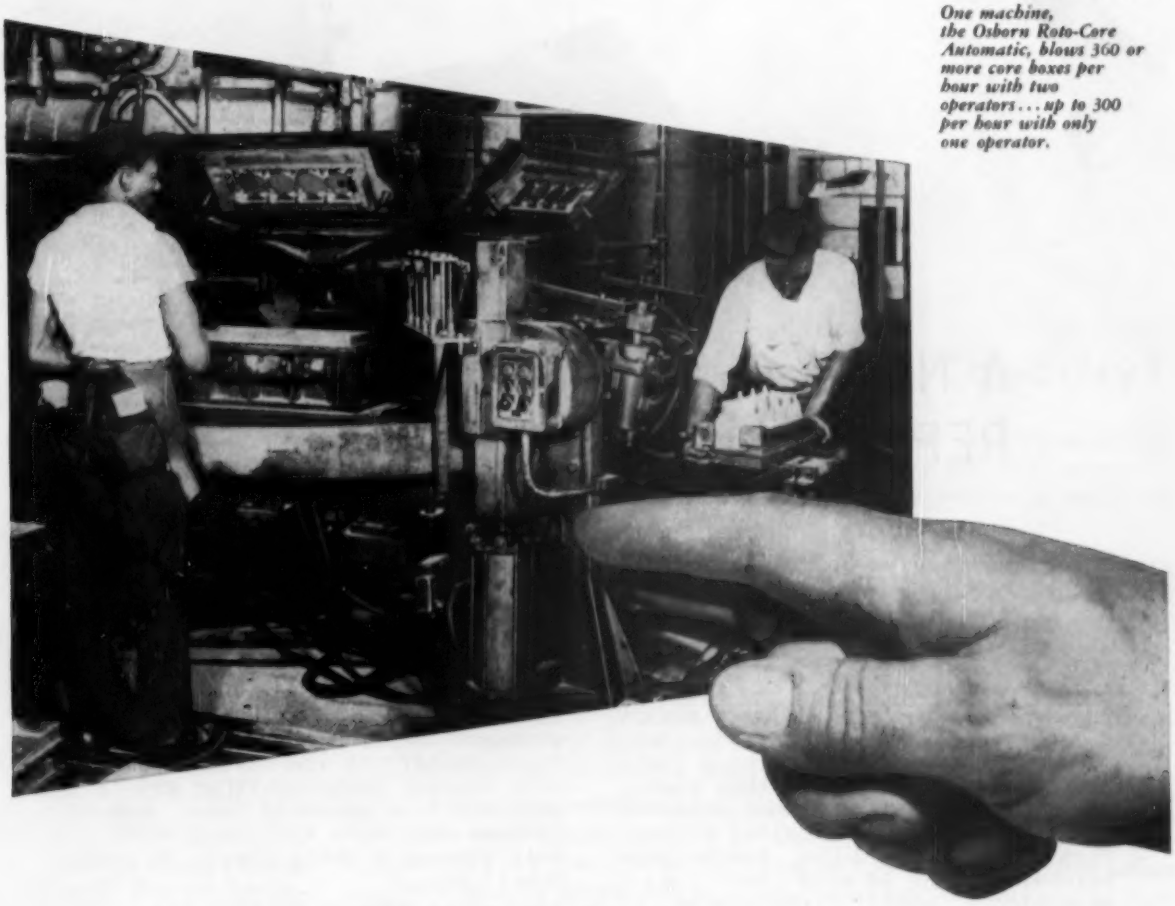

Put the finger on your casting costs

CHECK your method for making cores. It could be the real reason for high costs on your castings.

Whether you make or buy castings, it will pay you to look into Osborn's Roto-Core Automatic . . . now. You can now blow automatically . . . produce many more cores per man hour.

You can greatly reduce your core production costs regardless of the frequency of job changes. An Osborn representative can show you how. Call us today. *The Osborn Manufacturing Company. Dept. FF-35, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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MOLDING MACHINES
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CORE BLOWERS
BRUSHING MACHINES

ANOTHER EXAMPLE OF
OSBORN LEADERSHIP AND ADVANCED ENGINEERING

A NEWS REPORT

. . . from the home of FASTEST machining steels

Leaded plates—Now lead has been added to E-Z-Cut plate. As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, is much cleaner steel. First stocks include thickness up through 3".

Did you know that the largest stocks of Ledloy—world's fastest machining steel, await your call at Ryerson? Our stocks are largest from both a tonnage and size range standpoint. And stocks of other C.F. bars are also in excellent shape.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through 9½". So shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

"Increased production 200% using new Rycut leaded alloy"—"cut unit costs 32% using Ryerson Ledloy"—"reduced machining time 35% with New E-Z-Cut plates." Hundreds of reports like these testify to the savings realized with Ryerson faster cutting steels in shops from coast to coast. And Ryerson engineers will be glad to help you apply these steels to your operations.

You can be sure of getting the latest and best of proved fast-machining steels at Ryerson because, serving the widest market with the largest, most diversified stocks, we are in close touch with every new development.

So if you want to save on the final cost of a machined part—whether carbon, alloy or stainless steel—call the home of fast-machining steels—call Ryerson.

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Rycut Leaded Alloys	**New E-Z-Cut Plates**
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Indexed in the Industrial Arts Index and the Engineering Index.

Editorial:

Is There Enough Steel Capacity?

◆ IT IS HARD to convince a customer that you have his welfare at heart when he has a week's or less supply of steel. It is even more of a strain on customer relations when he is wondering where his next ton is coming from.

That picture applies to more and more customers as each week goes by in the steel industry. No one knows it better than the steel sales manager who this week will be trying to mollify the feelings of 10 to 30 of his favorite customers.

This brings up the question "Is there enough steel capacity?" Eliminating any fancy talk and foregoing the embarrassment of ducking out from under long-haired, legalistic and soft-soap explanations, the answer is—No, there isn't enough steel capacity.

Your steel supplier knows there isn't enough steel capacity. He plans to do something about it. Some firms are already on the ball, others will get started late this year or early next year. But before new capacity comes into operation there will be shortages in steel exceeding those which are showing up now.

No steel official is shouting it from the housetops, but a lot of currently counted capacity should be completely rebuilt or should be replaced with new equipment. That is in addition to new capacity which is needed because of rapid growth in population and in steel usage.

Some of the present steel capacity just isn't up to the demands being made upon it. It is old, it is obsolete, and it is high cost. It has no place in our modern industrial economy.

A steel expansion program has been with the Office of Defense Mobilization for some months now. ODM will soon make known its decision as to whether or not—and if so, how much—additional steel capacity will get rapid amortization treatment.

Regardless of how the expansion comes about, it is a must. Close to 3 million tons of new capacity will be needed each year for the next 15 years at least.

A strong steel industry—paying good dividends—is needed to bring out the funds necessary to keep steel capacity in step with the growth of our population and our country.

Tom Campbell

EDITOR-IN-CHIEF

SHARON *Quality* STEELS

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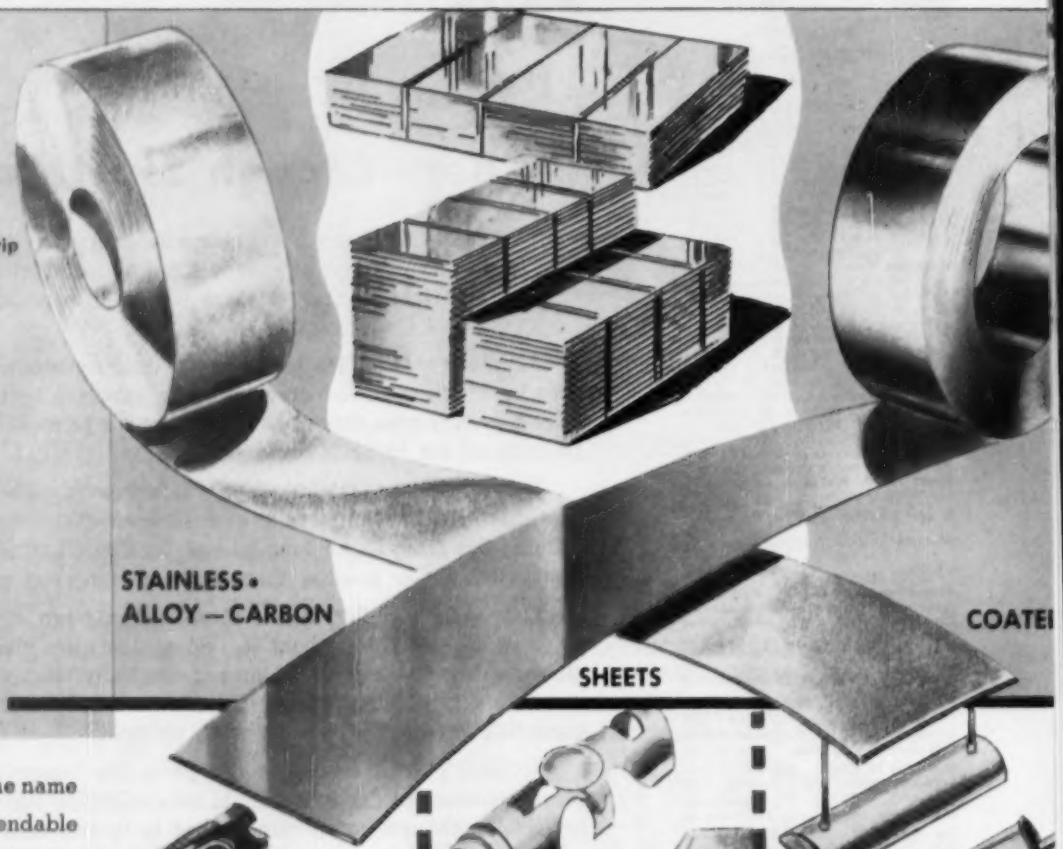
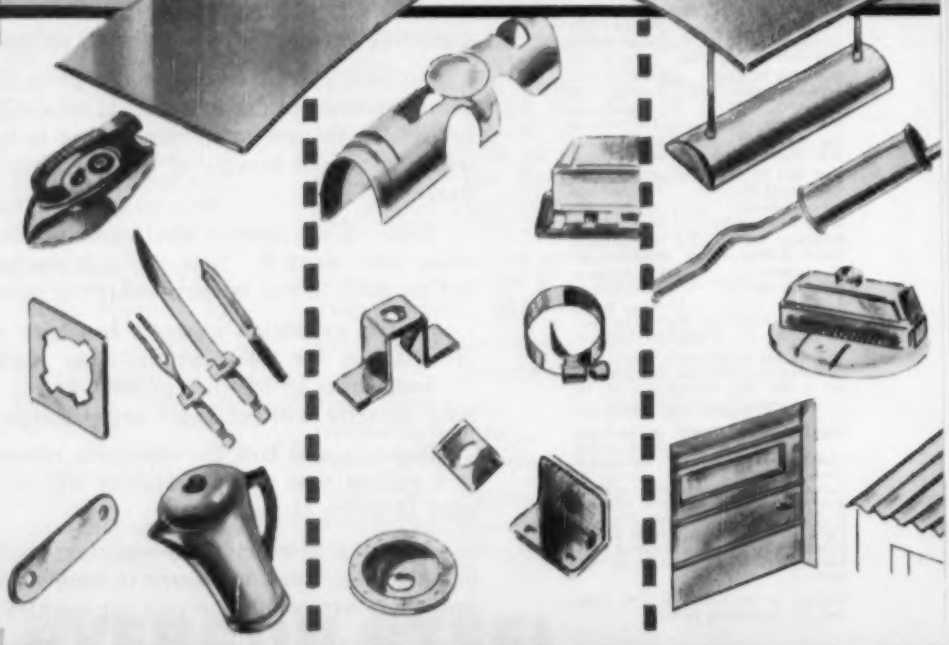
- Stainless Strip
- Hot and Cold Rolled Strip
- Galvanite* Strip
- Cutlery Steel
- Cold Rolled Spring Steel
- Hot and Cold Rolled Alloy Strip
- Plates
- Cooperage Hoop
- Electrical Sheets
- Deoxidized Sheets
- Galvanite* Sheets
- Galvanized Sheets
- Long Terne Sheets
- Enameling Sheets
- Sheet Bar
- Billets
- Blooms
- Slabs
- Open Hearth Steels
- Electric Furnace Steels
- Cor-Ten
- N. A. X.
- Copper Bearing Steel

*Trade Name

Sharonart



For more than 50 years the name Sharon has meant a dependable source for high quality steels. Whatever your requirements—stainless, spring, coated, high tensile, carbon or special steels—you'll find those bearing the red diamond of Sharon among the finest made anywhere. If you are experiencing difficulty in getting the quality you want, why not add Sharon to your supplier list? Inquire about Sharonart—A "surface designed steel."



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dear editor:

letters from readers

Competition

Sir:

We think the message Tom Campbell has conveyed in his editorial "How To Help Your Competition" in the August 11th issue is a very fine one.

May we have your permission to reproduce this for distribution to the sales organization in our own company? *John Graham, General Manager of Sales, American Steel & Wire Div., U. S. Steel Corp., Cleveland.*

Metal Whiskers

Sir:

Reference is made to the article, "Whiskers: Problem for Metallurgists," by D. G. Picinich, which appeared in the July 7, 1955 issue of THE IRON AGE.

I recall a similar phenomenon in experiments by Paul Agron at the Columbia University Project, around 1941. High temperature fluorination tests in copper equipment occasionally produced long filaments of copper on the walls of the vessel. Agron (now at Oak Ridge National Laboratory) recalls the above and also several related incidents.

Scientists at Bell Laboratories and at Westinghouse Research Laboratories may wish to check further on the above. *Frank Kerze Jr., Chief, Chemical Engineering Div. of Reactor Development, U. S. Atomic Energy Commission, Washington.*

Arc-Cast Molybdenum

Sir:

Your articles on arc-cast molybdenum, both parts I and II in your issues of August 4th and 11th, respectively, were very interesting and enlightening. This material shows great promise for future applications.

I will be pleased to receive copies of these articles so that they may be added to our reference files. *A. V. Alessandria, Research Dept., Foster Wheeler Corp., 165 Broadway, New York.*

Solubridge Controller

Sir:

In your August 18, 1955 issue, page 82, concerning automatic control of rinse tanks—we are anxious to contact the manufacturer of the Solubridge controller mentioned in your article. Could you please advise us? *Joseph Silverman, Keystone Silver, Inc., 509 West 34th Street, New York.*

The manufacturer of the Solubridge controller is Industrial Instruments, Inc., 89 Commerce Road, Cedar Grove, N. J.—Ed.

Celerimeter

Sir:

I would like additional information on Celerimeter as described in the May 12 issue.

We are looking for some sort of instrument to indicate table travel in *fpm* for hydraulic grinders and planers. *W. R. Beck, Equipment Engineer, Kearney & Trecker Corp., Milwaukee, Wis.*

Further information on the Celerimeter may be obtained from its manufacturer, the Lake Erie Engineering Corp., Buffalo 17, N. Y.—Ed.

Stereo Photography

Sir:

We are very much interested in stereoscopic photography in black and white and in color, under a magnification of approximately 25 diameters. Any further information which you may be able to offer on the item "Closeup on Research in 3-D" which appeared in the July 28, 1955 "Newsfront" would be greatly appreciated. *J. J. Brenza, Staff Metallurgist, Koppers Company, Inc., Metal Products Div., Baltimore.*

Further information may be obtained from Perkin-Elmer Corporation, Danbury Road, Norwalk, Conn.—Ed.

HERE'S NEWS FOR IRON FOUNDRYMEN!

7 big improvements made available to industry by HANNA, best known name in iron . . .

HANNATEN

THE IRON INGOT WITH THE NEW SHAPE

FOR USERS OF 10-LB. PIGS

6½" x 5¾" x 1⅜"

- NO FREE-CARBON POCKETS
- FINER GRAIN STRUCTURE
- MORE EVEN MELTING
- MORE ACCURATE CONTROL
- EASIER CHARGING BY COUNT
- LESS BREAKAGE
- EASIER HANDLING

Available in all grades and extra-close-grain HannaTite. (Standard 38-lb. pigs also available.)

THE HANNA FURNACE CORPORATION

Buffalo • Detroit • New York • Philadelphia

Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

Save up to $500 on your next gas fork truck

Priced about 25% under any other gas trucks in the popular 4000 lb. capacity, the Yardloader now brings cost-saving fork truck operation within the reach of practically every company with yard-handling problems. Travel speed approaching 14 miles per hour, large pneumatic tires, exceptionally high ground clearance and oscillating trail axle make it the ideal truck for outdoor service over large unimproved or semi-improved areas.

Heavy-duty industrial engine of proven make, 4-speed transmission and extra-heavy drive axle assure ample power for top performance under any conditions. Hydraulic lift to 122 inches, automotive-type steer, convenient controls and excellent driver visibility are a few of the features contributing to safety and ease of operation.

Get all the facts—and save up to $500.00 on your next gas fork truck. Write to The Baker-Raulang Company, 1227 West 80th St., Cleveland 2, Ohio.

BAKER

"Yardloader"

TRADE-MARK

5GY4

fatigue cracks

by William M. Coffey

What the Editor Wants

What the editor wants and what he gets in the way of news releases are not always one and the same thing. Reason is that a great many companies do not have advertising or public relations people or agencies to prepare their material. But they have a new product or a promotion in the staff and they want to tell people about it. So the job falls on someone who has never had any experience along those lines. He toils mightily but quite often produces material which is difficult to handle, at best.

So the Society of Business Magazine Editors has just spent a year compiling a little booklet on the "Do's" and "Don'ts" of writing releases. It answers such questions as: What about cheesecake? Do gimmicks help? What about pictures? etc. We have a few on hand for any of our friends who would like to have this handy little booklet. It's called "What the Editor Wants."

Caleb Flerk's Own Story (Part IV cont.)

Synopsis of preceeding installments—Caleb Flerk has succeeded at last in getting his arrplane started—a Navy fighter plane abandoned on Caleb's farm after the war. Tearing off across his field he finds himself heading straight for Easby's barn. Caleb, in his own words, continues his adventures.

It don't take me long to realize that things arnt goin rite about the time i sea people scatterin for cover for Easbys yard so i start lookin for the handle which will hist the arrplane off the groun. Thrers a wheel says "nose-up" on it so i quick-like give her a twirl and then shut my eyes. I feel that arrplane hop off the groun an start twirlin aroun in the air like a oak leef twister an when i take a peek, we're goin strait up an im lookin plumb down on Easby's north flue. Im not lookin for long tho as the next thing i know the sky, the groun, the clouds, trees, barns, cows are all jumbled up an i caint figger thwere i am from one minute to the next. All of a sudden the plane starts shakin and jumpin around like its got the ague and the motor starts snarlin an moanin powerful loud an then the groun starts comin up rigt fast. *(to be cont.)*

Puzzlers

We little realized the interest that Mr. Porter's problem on time study (affectionately now known as Jenny's dilemma) would arouse. Seems everybody came up with a different solution, but the one we like best is explained by W. B. Halbrooks, Birmingham, Alabama. He says:

Mr. Porter's calculation provided the number of pieces required to equal 100% performance for the extra pieces. Jenny was already producing 162.5 pieces per hour or 130.4875% performance. His figure 44.048 x 130.4875% equals 57.477134 extra pieces per day to maintain the same performance. The Honor Roll for this puzzler carries these illustrious names: Alec Jacobs, Mel Tudor, Dictograph Products; Vi Vidoloff; Robert E. Pomeranz, President, General Foundry and Machine Co.; I. Komarnitsky, Continental Equipment Co.; the Great Commonwealth Bunch; I. M. Darcey; V. McIntyre, Reo Motors; F. E. Ward; S. B. Blodgett, Aerovox Corp.; F. E. Fitzgibbon, Keen Manufacturing Co.; J. F. Robinson, U. S. Steel; Arthur L. Milford, Fairfield Mfg. Co.; and David Sherbowine, Ohio Brass Co.

We're sending all your solutions to Mr. Porter and Jenny. One more job well done. The loyalty of fatigue cracked readers is surpassed only by their brilliance.

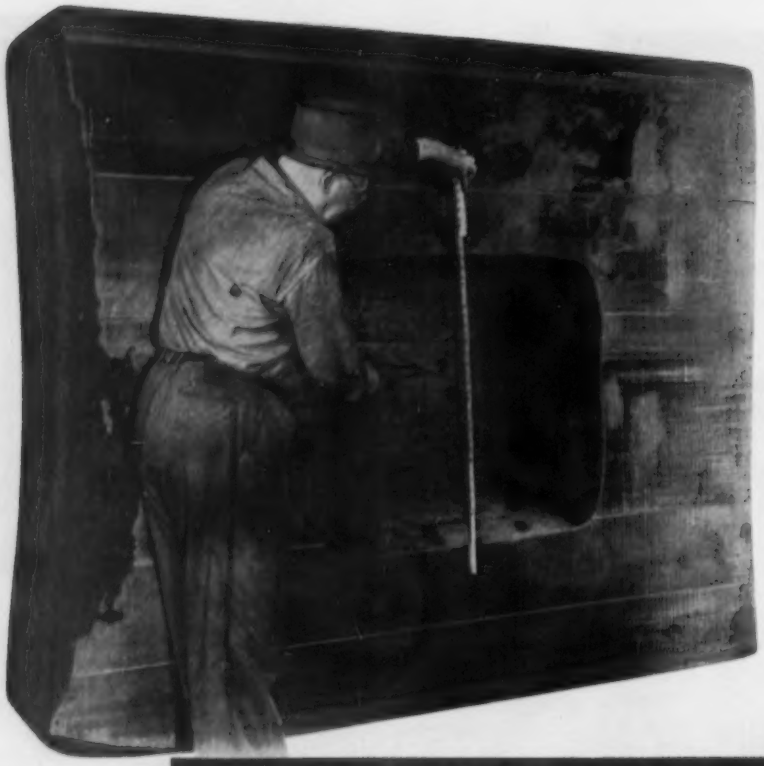
Better steels are the result of many things, not the least of which are addition agents. Although they may be small quantitatively, additives are extremely important qualitatively.

For many years, Foote Mineral Company has aided steel makers in materially improving both the quality of finished steel and the intermediate conditions involved in producing it. Manganese Sulphide and Rimex are two steel additives developed by Foote. Manganese Sulphide provides a more practical and economical means of introducing manganese and sulphur into free-machining steels. Rimex, by producing a more vigorous rimming action, improves the quality of rim steels while reducing production costs.

Foote's highly specialized metallurgical engineering group is eager to work with steel producers to find means to improve both the economies and characteristics of metals for industry.

Write for information. Product data sheets will be sent upon request.

FOOTE MINERAL COMPANY
433 Eighteen W. Chelten Bldg.
Philadelphia 44, Pa.
RESEARCH AND DEVELOPMENT LABORATORIES:
Berwyn, Pa.
PLANTS: Exton, Pa.; Kings Mountain, N.C.; Sunbright, Va.



Forged-in pockets provide tougher, stronger dies

This 35,000-pound die block, made of Finkl FX-T3 steel, has a forged-in pocket 12″x29″x34″. In addition to the improved physical properties, the pocket forging increases the saving in machining time. There are many ways, such as this, that Finkl engineers can help you when planning die block or forging requirements.

When you next consider hot work tooling, die blocks or forgings, consider Finkl for the best. The quality of Finkl Hot Work Die Steels is the finest available and costs you less in the long run. Finkl die blocks will make a lasting impression with "impressions that last." Our engineers will gladly offer the advantage of their knowledge and our experience. There is no obligation.

DIE BLOCKS
•
HOT WORK STEEL
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FORGINGS
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ELECTRIC FURNACE STEELS

Offices in: DETROIT • CLEVELAND • PITTSBURGH • INDIANAPOLIS
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dates to remember

SEPTEMBER

INSTRUMENT SOCIETY OF AMERICA —Annual meeting, September 12-16, Shrine Auditorium, Los Angeles. Society headquarters are at 1319 Allegheny Avenue, Pittsburgh.

PACKAGING MACHINERY MANUFACTURERS INSTITUTE — Annual meeting, Sept. 15-18, The Homestead, Hot Springs, Va. Institute headquarters are at 342 Madison Avenue, New York.

SOCIETY OF INDUSTRIAL PACKAGING & MATERIALS HANDLING ENGINEERS—Annual meeting, September 19-22, Kings Armory, New York. Society headquarters are at 111 West Jackson Blvd., Chicago.

EXPOSITIONS

Chicago, Sept. 6-17.

MACHINE TOOL SHOW — International Amphitheatre.

PRODUCTION ENGINEERING SHOW—Navy Pier.

COLISEUM MACHINERY SHOW — The Coliseum.

OCTOBER

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall general meeting, October 11-15, Morrison Hotel, Chicago. Institute headquarters are at 36 W. 46th St., New York.

FOUNDRY EQUIPMENT MANUFACTURERS ASSN. — Annual meeting, October 13-15, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 1008 Engineers Bldg., Cleveland.

CONVEYOR EQUIPMENT MANUFACTURERS ASSN. — Annual meeting, October 15-18, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at No. 1 Thomas Circle, Washington, D. C.

EXPOSITIONS

Philadelphia, October 17-21.

NATIONAL METAL CONGRESS AND EXPOSITION.

AMERICAN COKE & COAL CHEMICALS INSTITUTE—Annual meeting, October 17-18, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters are at 711 Fourteenth St., N. W., Washington, D. C.

AMERICAN GAS ASSN. — Annual convention, October 17-19, Los Angeles. Association headquarters are at 420 Lexington Ave., New York City.

AMERICAN WELDING SOCIETY—National fall meeting, October 17-21, Philadelphia. Society headquarters are at 33 West 39 St., New York City.

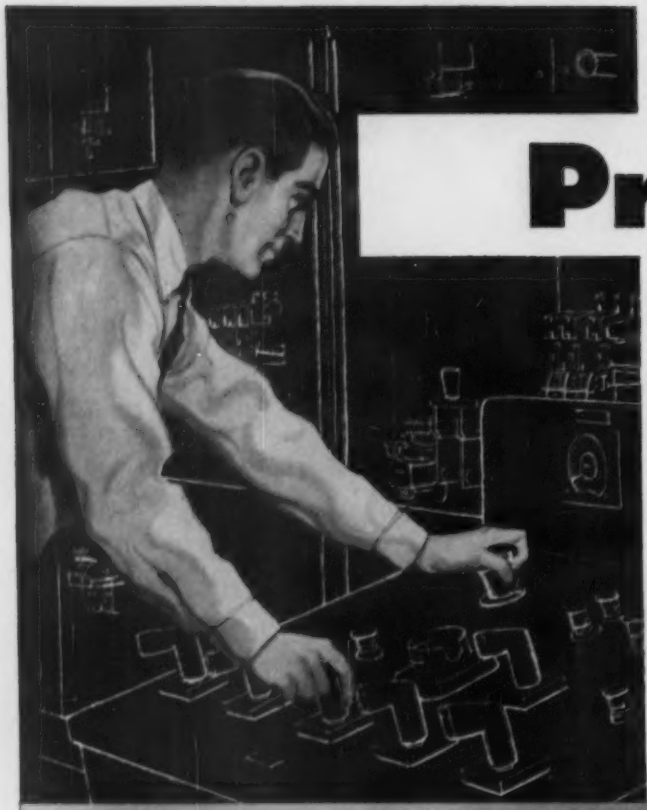
PUT MUSCLE behind your BLAST CLEANING

Does your present abrasive have muscle enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned.* Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test —put muscle behind *your* blast cleaning with Malleabrasive! *We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.*

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

U. S. Patent # 2184926 (Other patents pending)

MALLEABRASIVE®



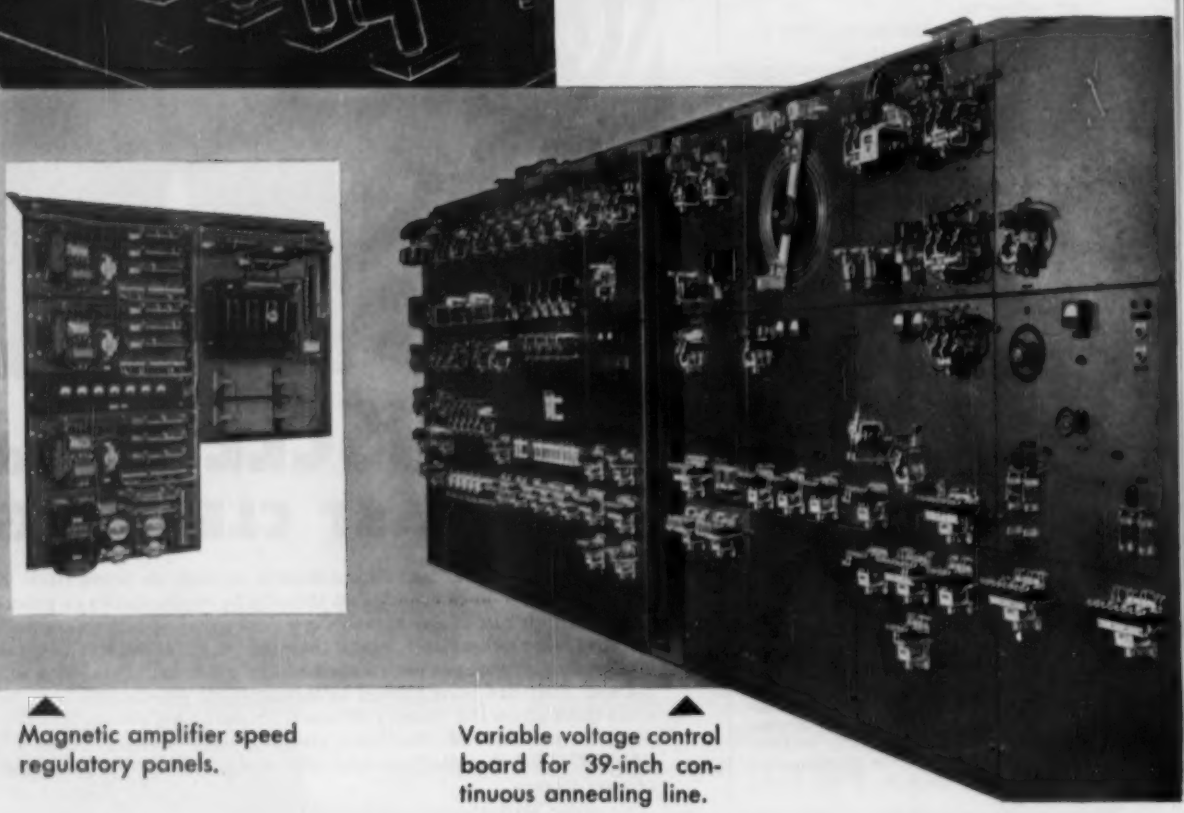
ALLIS-Processing

Allis-Chalmers constant potential and variable voltage systems are providing dependable precision control in many of the nation's largest mills.

When you modernize

to meet the double challenge of a growing market and heavy competition, take advantage of Allis-Chalmers experience. See your nearby representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4659



Magnetic amplifier speed regulatory panels.

Variable voltage control board for 39-inch continuous annealing line.

AC ALLIS-CHALMERS

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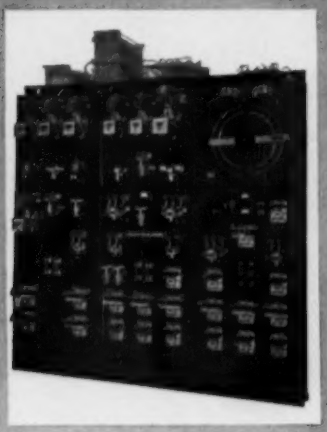
Line Control



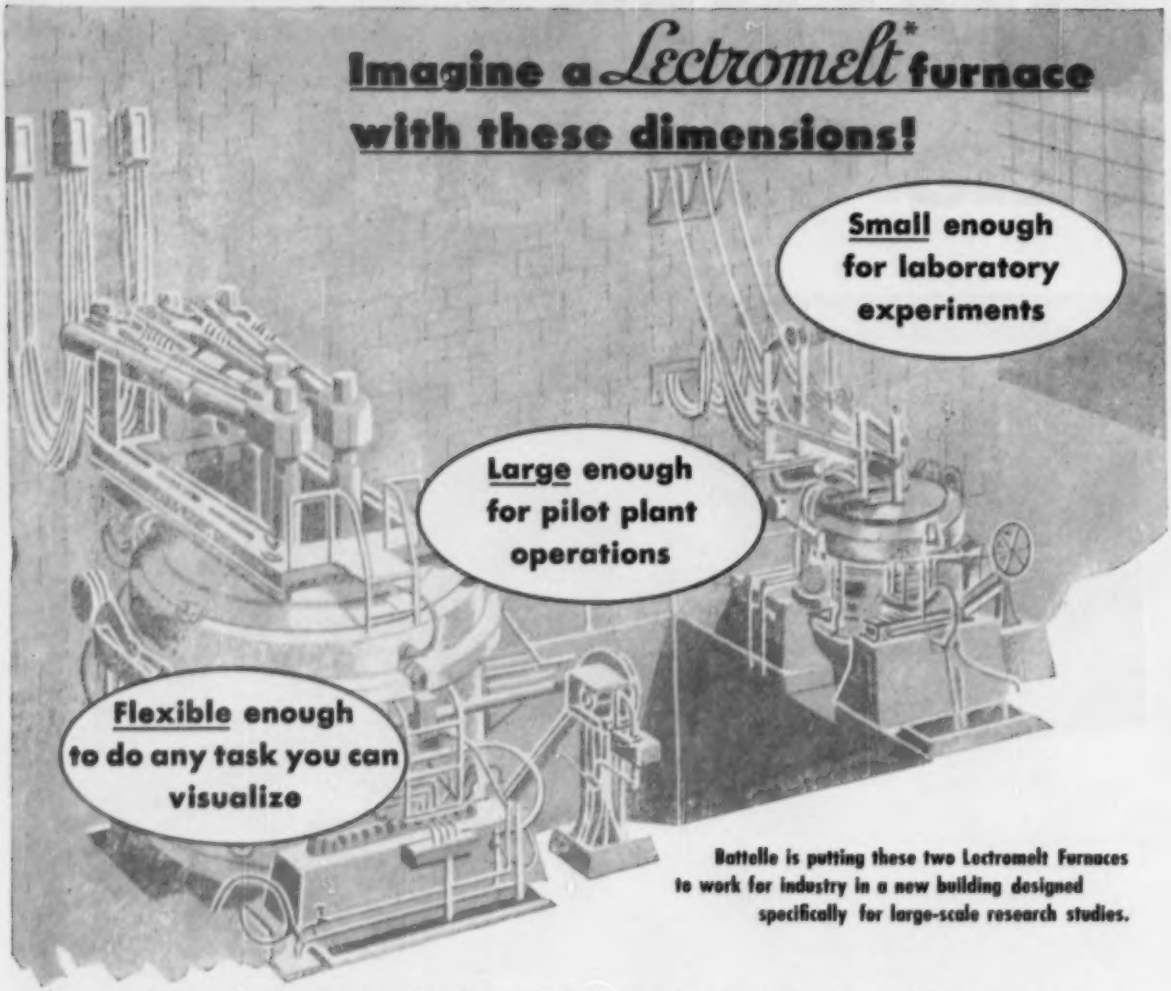
Entry section control board for pickle line.

Delivery section control board.

Delivery end operator's desk, stainless steel top.

Riveter's cabinet, stainless steel front.

CHALMERS


Imagine a Lectromelt* furnace with these dimensions!
Small enough for laboratory experiments
Large enough for pilot plant operations
Flexible enough to do any task you can visualize

Battelle is putting these two Lectromelt Furnaces to work for industry in a new building designed specifically for large-scale research studies.

Imaginations were allowed free rein at Battelle Memorial Institute, Columbus, Ohio, and this Lectromelt* Furnace Equipment is the result. Any type of furnace shell can be employed, including a 7-foot, open-top stationary smelting shell, a traveling, rectangular hearth for progressive smelting, or a steel-melting type of 1-ton capacity with 90° nose tilt. All can be operated with or without a roof.

Electrodes can range from four to eight inches in diameter, and can be placed in any configuration—triangular or in-line. 144 possible voltage connections, from 23 to 554 volts, are provided by the oversize furnace transformer.

Battelle is counting on you to put this furnace to work

The scope of metal refining and recovery projects will be widened considerably by the addition of this second Lectromelt Furnace. Two-slag smelting research on methods of recovering metals now wasted is an important possibility. Cheaper scrap for melting . . . how to handle hot metal charges . . . special reduction and melting processes . . . more economical use of the high temperatures developed in electric furnaces—these are typical problems warranting study.

Added knowledge on the physical chemistry of slags will broaden the field of application of electrothermics. Procedures in ferro-alloy production can be analyzed more accurately because of the exact gradations in voltage provided. A cut in calcium carbide costs may result from a search for a method of using a poorer grade of raw materials and a recirculation of calcium oxide sludge.

For a free copy of Lectromelt's Catalog No. 9-A, write Pittsburgh Lectromelt Furnace Corporation, 312 32nd St., Pittsburgh 30, Pa.

*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID Lectromelt

Gray Iron mounting plate, for use on a water circulating pump, was cast to shape with holes cored.

Casting or steel plate ...which costs less?

This pump mounting plate when it was flame cut from hot-rolled plate and drilled, cost $1.92.

Then it was redesigned in Gray Iron

Now it costs $1.33 . . . a saving of 30%. The holes are cored and the only finishing on the casting is surface grinding on both sides.

Economy is only one reason for redesigning parts in Gray Iron. This versatile metal can give you strength, rigidity, wear and corrosion resistance . . . and many other unique engineering advantages.

Call your nearest Society member foundry and the full facilities of this association will be available to help you. Or, write direct to Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

MAKE IT BETTER WITH GRAY IRON

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

GRAY IRON FOUNDERS' SOCIETY

Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

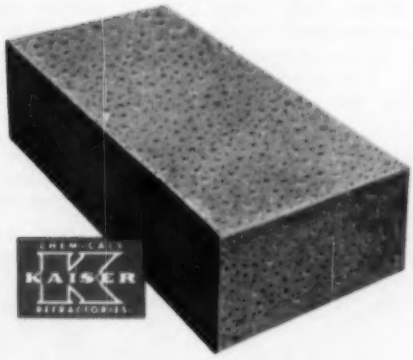
For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of *Kaiser Chemicals*

Pioneers in Modern Basic Refractories



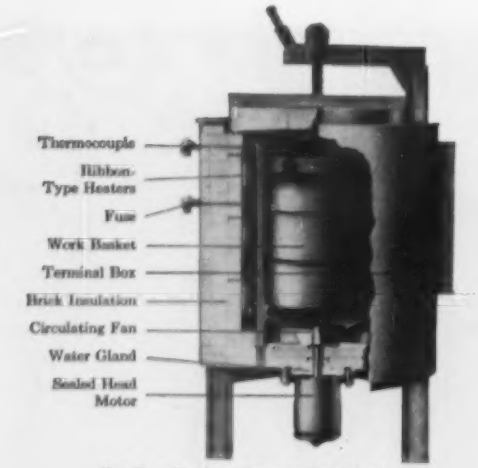
REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

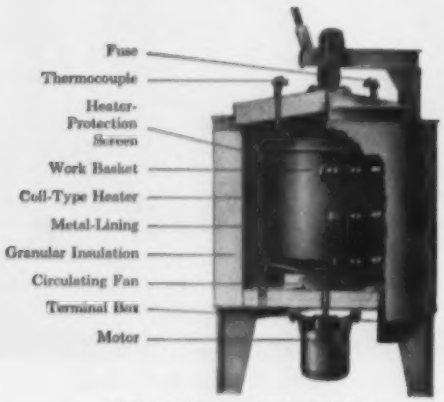
- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

***Now available!* A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

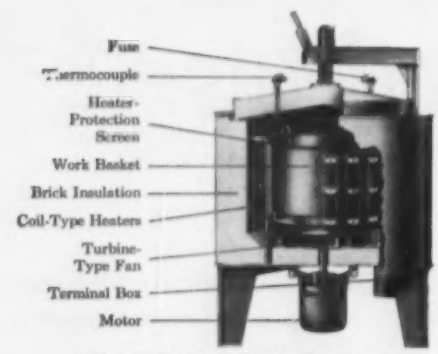
Installation advice on request



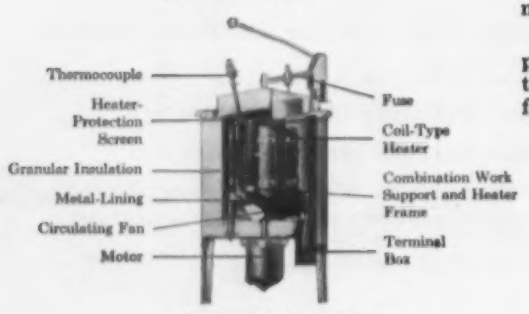
For Production Parts to 1650 F



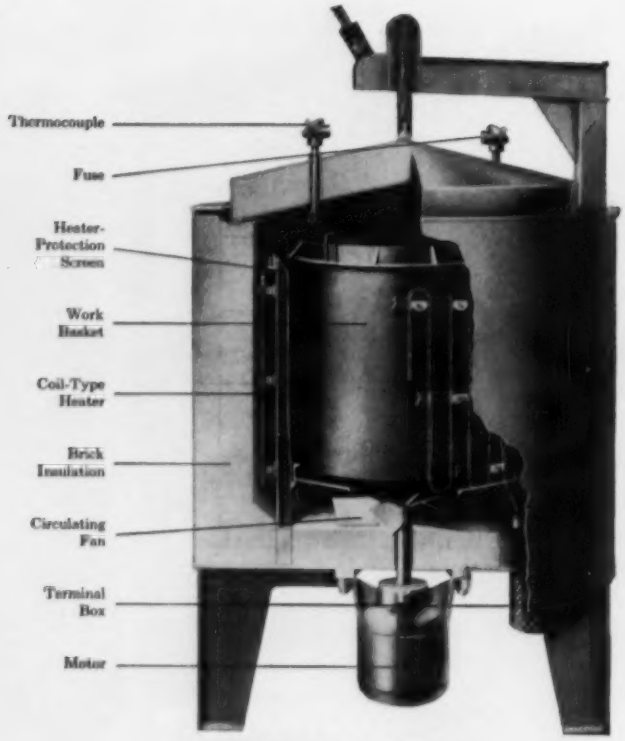
For Production Parts to 800 F



For Dense Load Production Parts to 800 or 1400 F



For Tools to 1200 F



For Production Parts to 1400 F

ONE OF THESE L&N HOMO FURNACES IS

Built for Your Job!

● Whether you temper steel, anneal glass or solution treat aluminum; whether temperatures are under or over 1000 F; whether loads are dense or open, there's a Homo furnace to handle the job. And it will give you fast heats . . . low cost production that meets quality control standards.

We'll be glad to help you investigate your potential savings. Just give us a brief description of your individual heat treating problem. We'll refer you to a plant using the Homo method for work like yours. Then you can see for yourself.

In the meantime, for more information about these completely "packaged" equipments just phone our nearest district office or write us at 4956 Stenton Ave., Phila. 44, Pa. for catalog TD4-625, "The Homo Method for Tempering".

LEEDS LN **NORTHRUP**
instruments *automatic controls* • *furnaces*

Coming to the Metal Show? Don't miss the IHEA Symposium on Heat-Treat Developments.

HOW TO BUY V-BELTS

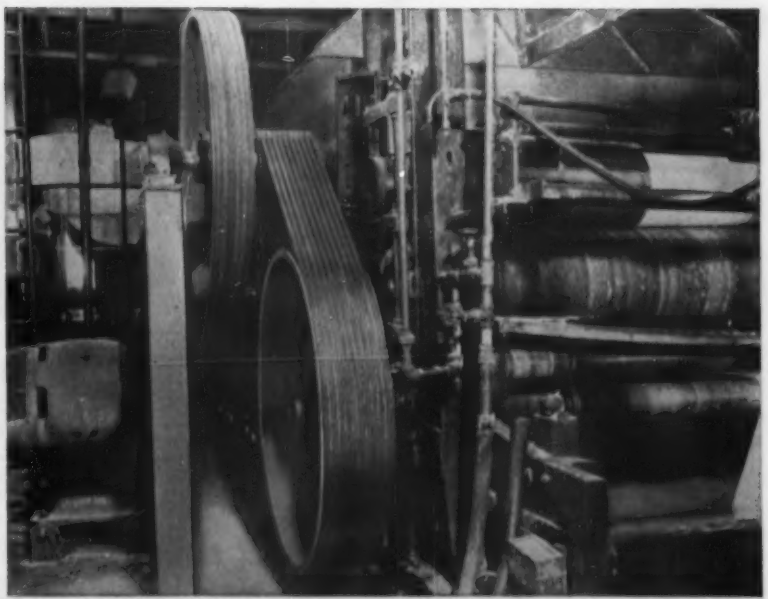
FOR TOUGH, RUGGED DRIVES

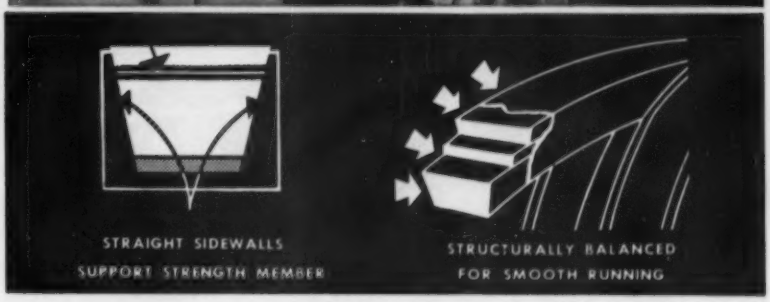
. . . and get "More Use per Dollar"

Look for a V-belt construction that provides longer life under shock loads . . . extra strength with the use of the right synthetic strength member.

Precision balance of all parts of the V-belt makes for a smoother running drive, fewer matching problems . . . and longer life for all belts on a multiple drive. Belt strength members of super-strength cords should be correctly positioned in the neutral axis section of the belt so as not to stretch or compress unnecessarily as the other parts of the belt are flexed in use. Straight belt sidewalls help support strength members in a straight line, permit all cords to pull equally . . . deliver their full share of power. You get more grip, less slip because the belt presses tightly against the sheave grooves when rounding pulleys.

Specify by name the V-belt engineered to give you extra strength and extra pulling power . . . specify R/M Super-Power V-Belts.





R/M SUPER-POWER V-BELTS

With these superior V-belts you get up to 40% more power capacity, or fewer belts can be used on the same drive, thanks to R/M's new synthetic super strength member. They provide greater elastic resistance to shock loads and permit virtually no stretch. R/M Super-Power V-Belts are oil-proof, non-spark, heat resistant. You get the balanced combinations of features you need for more power on rugged multiple drives. Let an R/M representative show you how R/M Super-Power V-Belts, as well as Condor V-Belts, last longer on the job . . . give you "More Use per Dollar".

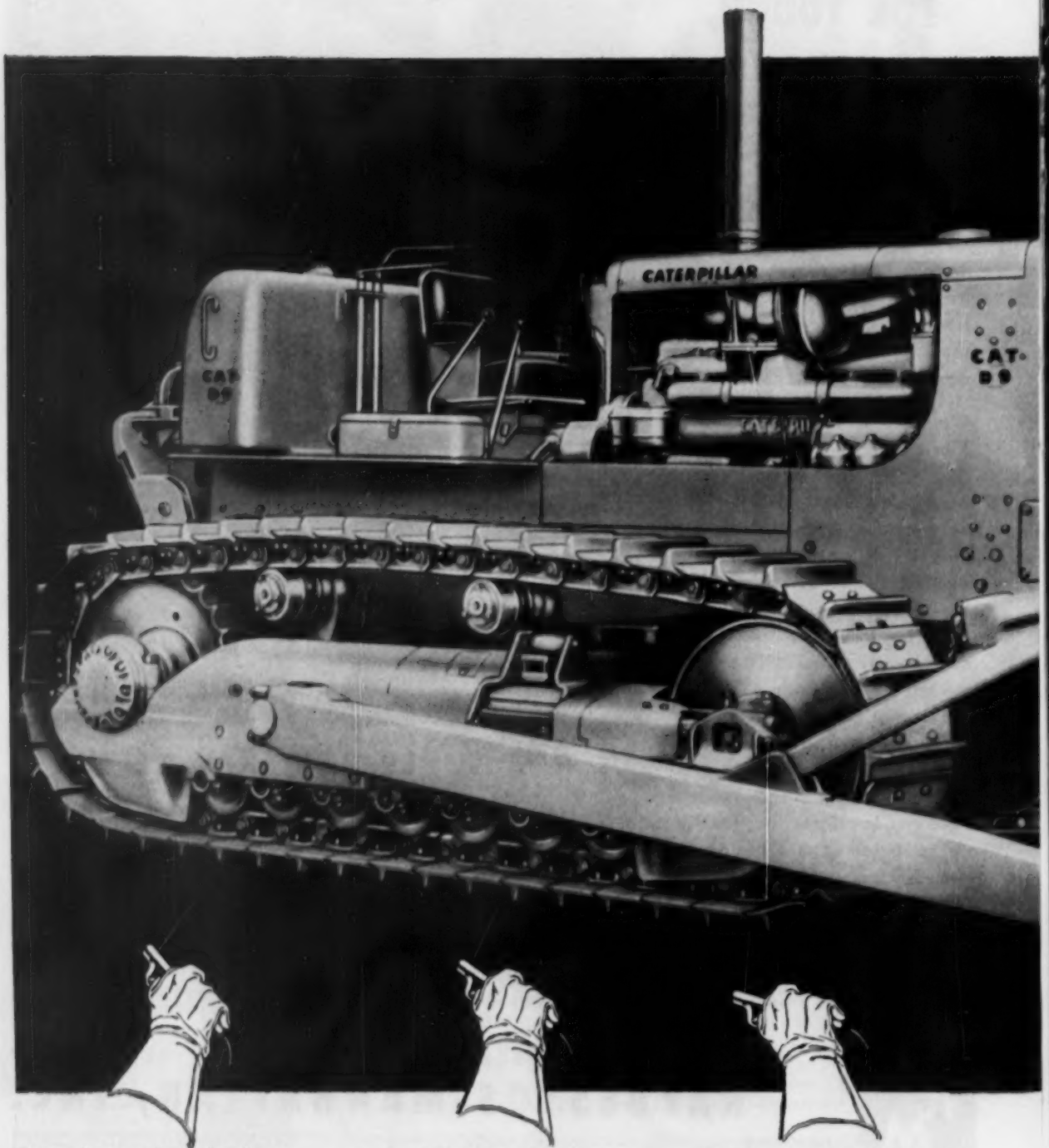
RM-513

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Bowling Balls

A. O. Smith welding



To give frame and gear box bonus strength—guts to withstand extreme punishment—Caterpillar welds with A. O. Smith's SW-35 electrodes. SW-35 (E-6020) electrodes produce 45° fillets without undercut, are ideal for downhand welding, too.

A. O. Smith SW-17 electrodes are used to complete the mighty D9's frame. These AWS Class E-6012 electrodes lend themselves to heavy production welding . . . possess greater built-in toughness than other electrodes in their class.

Critical parts of the D9's steering clutch case are welded with A. O. Smith SW-15 electrodes. High heat and high speed combine with stand-out performance in all positions to make these the finest universal electrodes in AWS Class E-6013.

(Advertisement)

The first semi-continuous

electrodes help build world's biggest crawler tractor

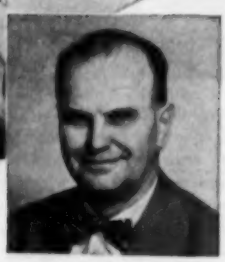
CATERPILLAR D9 TRACTOR

Built for brutal service . . . this the mightiest of all crawler tractors delivers 230 turbo-charged horsepower at the drawbar.

Reliable performance on the world's toughest projects results from Caterpillar's engineering and manufacturing skill . . . unfailing insistence on quality. The company is famous for using only the finest materials and components. For years, they have been among the largest users of A. O. Smith electrodes.

NOTE! *A. O. Smith supplies three kinds of welding electrodes for use in the manufacture of the world's biggest crawler tractor — the D9. These electrodes are favorites with the welding operators who work on the D9 line. Of course, all three electrodes were selected after thorough testing . . . after they had proved their ability to produce Caterpillar-quality welds all the time.*

If welding quality is on your mind, too, it will pay you to investigate A. O. Smith electrodes. See the representative who calls on you . . . or write A. O. Smith Corporation, Welding Products Division, Milwaukee 1, Wis.



The man from A. O. Smith . . .

Erv Steidl is the representative who helped Caterpillar select the right A. O. Smith electrodes for use on the D9. Not just a salesman — but a trained welding consultant — the man from A. O. Smith will be glad to help you with your welding problems.

PRODUCED BY WELDERS FOR WELDERS

Because welding is our full-time business, we offer you America's top line of welder-proved electrodes, machines and accessories.

Through research . . . a better way

A.O.Smith

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WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin

INTERNATIONAL DIVISION: MILWAUKEE 1, WIS.

(Advertisement)

high vacuum furnace

(Advertisement)

The first semi-continuous,

1. Operation of the first semi-continuous, high-vacuum furnace. The furnace operator (upper deck) has reached the desired pressure and melted the charge. The melt's temperature is between 2800 and 3200° F.

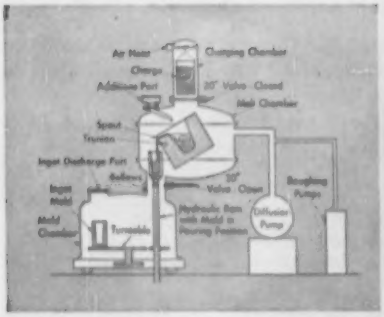
The operator is now swinging a chute out over his melt. Down this chute he will send alloying materials.

The next bulk charge rests in the interlock on top of the furnace. After he pours the melt and valves-off the mold chamber from the main furnace, the operator will introduce this second bulk charge to the crucible-coil assembly.

This is basically the operation of the Carboloy semi-continuous furnace. Valved interlocks allow repeated charging, melting, alloying, casting, and removal of ingot molds *without breaking vacuum.*

Notice the furnace's modular design which divides it into four sections—charging interlock (bulk and alloy additions), chamber cover (sampling, control, and inspection devices), furnace chamber (crucible-coil assembly, induction heating, and high capacity vacuum pumping), and chamber bottom (ram lift, mold table, and interlock).

The schematic drawing below shows these clearly and labels the parts discussed under the remaining pictures.



2. This drawing shows how an air hoist lowers the bulk charge to the crucible-coil assembly. Induction heating produces a homogeneous melt. High-vacuum pumping frees the melt of unwanted gases.

Alloying materials are introduced at the precise moment to produce the desired composition in the cast ingots.

A hydraulic ram lifts a mold to pour position and the ingot is cast. The ingot mold then returns to the turntable. It is indexed to a hot-topping position as the next mold moves to the ram-lift position.

3. A bulk charge swings into position over the charging interlock. The operator will lower the charge into the interlock. He then seals the interlock and exhausts it to equal the pressure in the furnace chamber. When this is accomplished, he opens the valve between the interlock and the furnace and lowers the charge to the crucible-coil assembly.

There are ports available for introducing power to pre-heat the charge before the interlock is opened to the furnace chamber. This accelerates production and reduces thermal shock to the coil-crucible assembly.

4. The operator uses a self-sealing sampler to pull slugs from the melt for analysis. All control and inspection devices focus on the operator, giving him continuous knowledge and control of the melt's progress.

Behind the operator is a central panel for the pumping and valve system. On its front is a flow diagram of the entire furnace with bright lights showing the status of the process at all times.

The furnace chamber contains such other equipment as a bridgebreaker, pyrometers, view windows.

(Advertisement)

high-vacuum furnace

Designed and built by

CONSOLIDATED VACUUM *for* CARBOLOY

CVC's modular design concept provides tremendous leeway in planning for future as well as present needs

The capacity and flexible design of this new CVC furnace call for careful evaluation of the role high vacuum can play in your company.

The furnace is now operating at the Carboloy Department of General Electric Company, Detroit, Michigan.

A high-vacuum, melting and casting furnace, it marks the solution to many problems which have bottlenecked the progress of vacuum metallurgy.

The first *semi-continuous* furnace, it melts charge after charge without breaking vacuum.

Its 1,000-pound crucible capacity gives a monthly yield of 120,000 pounds of high-purity metal.

Compact design and a system of remote controls make materials handling easier than ever before.

The world's fastest oil diffusion-ejector pump (CVC's type KS-16,000) evacuates 12.5 pounds of air an hour from the Carboloy furnace chamber.

CVC designed this furnace on the modular or "building block" principal. Initially, you can purchase the basic furnace module for batch operation with relatively small capital investment. Later, as production warrants, you can achieve full capacity, semi-continuous operation simply by adding the other modules.

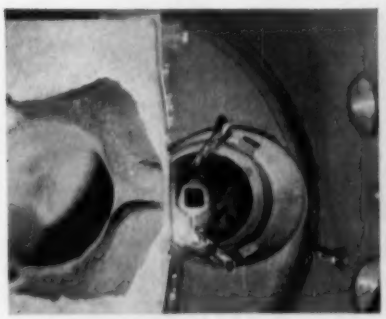
As you read the story of the Carboloy operation, review your thinking on vacuum metallurgy. Consider its usefulness to your company as a profit maker. Then, permit us the opportunity of showing you how our advanced designs and manufacturing experience can produce for you an economical high-vacuum furnace.

• *A series of three CVC Information Memos on modular, high-vacuum furnace design is available on request.*

Consolidated Vacuum Corporation ROCHESTER 3, N. Y.

a subsidiary of CONSOLIDATED ENGINEERING CORPORATION, *Pasadena, California*

CVC sales now handled through Consolidated Engineering Corporation with offices located in: Albuquerque • Atlanta Boston • Buffalo • Chicago • Dallas • Detroit • New York • Palo Alto • Pasadena • Philadelphia • Seattle • Washington, D.C.



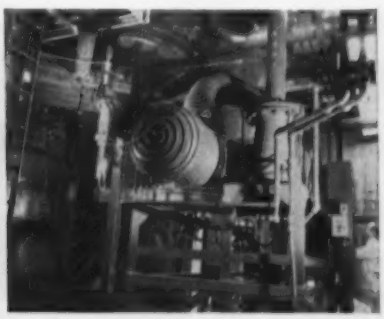
5. The 1,000-pound capacity induction crucible-coil assembly pivots on heavy-duty trunnions.

The mold lies in readiness some 15 feet below in the mold chamber. When the melt is ready to pour, a hydraulic ram thrusts the mold up under the crucible lip. The resulting short-pour distance from the crucible to the mold bottom produces high quality ingots.

At the completion of the pour, the mold chamber is valved off and removed from the furnace chamber.

6. The operator controls the melt's crusting action with a manual bridgebreaker. He observes the action through 6" sight windows (PYREX glass) located near his feet. He can remove the bridgebreaker without disturbing the furnace pressure.

To his left is an alloy additions interlock in which alloying materials are stored in small cans with drop-out bottoms. At exactly the right moment the operator adds these materials to the melt by means of a chute which sends them to the crucible.



7. The world's fastest pumping high-vacuum pump can hold the pressure in the furnace chamber below one micron. It's CVC's type KS-16,000 oil diffusion-ejector pump.

After "roughing" with mechanical pumps to approximately 8mm pressure, the operator valves in the KS-16,000. It removes 1,000,000 micron-liters of gas a second (12.5 pounds of air an hour) from the furnace until the desired pressure in the .5 to 10 micron range is obtained. Its reserve capacity handles any pressure surges with ease.

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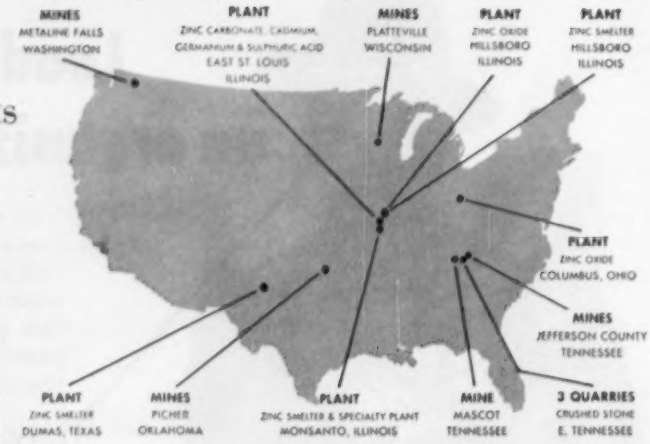

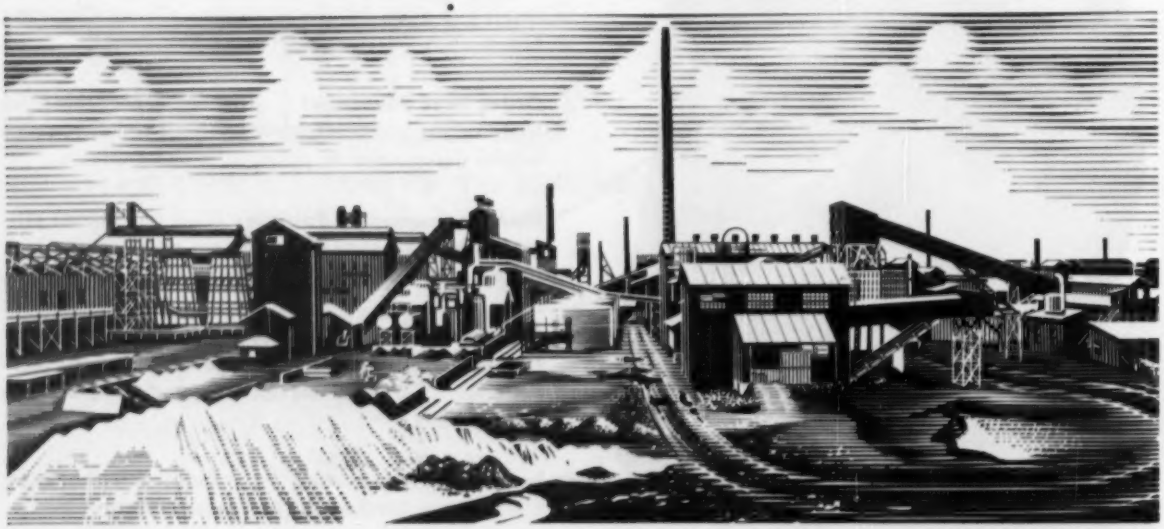

FAIRMONT CITY, ILLINOIS
(East St. Louis)

Operations include: roasting and sintering of zinc concentrates; cadmium plant producing commercial balls, sticks and plates; zinc carbonate plant; germanium plant producing germanium dioxide for the electronics industry. Sulphuric acid is produced by both the Chamber and Contact methods. For complete picture of American Zinc operations, see map above.

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ALL GRADES OF SLAB ZINC
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The Iron Age Newsfront

New Piggy-Back Idea

Latest gimmick in piggy-back railroading is a self-unloading flatcar now being designed by a Midwestern firm. It'll have a complicated hydraulic or compressed-air system which will raise and swing it to the side, the end resting on the dock. This will eliminate end loading and permit truck trailers to run on the level directly onto the flatcar while the train remains coupled.

Small Shops Have Tough Going

The country's smaller machine shops are closing their doors at an increasing rate. Larger equipment and expanded facilities of the bigger operators has enabled them to get the lion's share of existing work. The small shops can't keep pace. Unions have added to their woe and overhead.

Expand Foil Output

Alcoa revealed intensive plans for improving its position in the aluminum foil field. At present, about 4 to 5 pct of the total fabricated output is foil, but plans now call for increasing this output to between 8 and 10 pct.

Water, Water Everywhere

The most complex problem created by the flood at the Chase Brass Mill on the Naugatuck River is ironically the lack of water for plant operation. Repair of the purification system is so complicated that it probably will be the last project to be completed.

Scientific Education Gets Lift

The Eisenhower Administration will soon come out with a plan to improve the quantity and quality of scientists and engineers. The President has already approved the plan. Government, as well as industry, is concerned over the mounting gap between supply and demand, especially in view of Russia's success at interesting students in these fields.

Research Growing Into Big Business

Metallurgical research is fast becoming a big business for market-wise producers and consumers. Inland Steel's $750,000 investment at Purdue University has already turned out Ti-Namel, Hi-Steel and Ledloy steels. The millions spent by Jones & Laughlin, United States Steel and General Electric is further evidence that research dollars are a good investment in a better business future.

Drive On For Welded, Bolted Structures

Bolt makers and welding equipment manufacturers are stepping up pressure to have municipal codes changed to permit greater use of their products. Both can show proof of added strength, increased safety and reduction in the steel needed. The result will likely be a growing use of a combination of welding and bolting. Had either method been used, crews would not now be replacing loose rivets in the Golden Gate Bridge.

Closed Circuits Add To Damage

Failure to throw switches cutting off power during the recent flood caused extensive short circuiting and explosions in the power plant of one firm. Had the circuits been opened, a minimum of repair would have been necessary. The firm must now rewire the entire plant.

Instrument Speeds Steel Analysis

Steel samples can be analyzed and the information relayed back to the melt shop in less than 10 minutes by use of a quantometer. The analysis itself takes only a minute.

Oxy-Town Gas Flame Hardens Shafts

Crankshafts for diesel engines are hardened accurately and uniformly by one firm using oxy-town gas. An automatic temperature control indicates the ideal time for quenching.

MIDVALE *DRUM* SHAFT FORGED TO *BEAT* FATIGUE

Forge it uniformly . . . finish it to extremely close tolerances . . . and deliver it fast—they were the requirements on this large alloy steel drum shaft for a mine overseas. In record time Midvale poured the ingot, shaped the shaft in its huge presses and had it finished to an overall length of 40 feet 6 inches, diameter of 38 inches with a bore of 7 inches.

This type of service has been routine to the men of Midvale for more than a half a century. They have made a specialty of supplying the mining industry with large forgings and castings of all types. Midvale quality is carefully guarded from the time the ingot is poured until the finished piece is loaded for shipment. Tests and supervised inspections are made in every step of production. Final tests—X-ray, sonic and others as specified—assure sound forgings and stainless steel castings for outstanding performance in the most severe service.

Next time you need shafts, rolls, roll shells, gear rings or high alloy castings get in touch with Midvale. You can be certain of satisfactory service and products.

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MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, CORROSION AND HEAT RESISTING CASTINGS

Up-to-Date Lighting Means Savings

Modern lighting methods recover more than installation costs . . . Morale improves under brighter working conditions . . . Accident rates can be slashed . . . Ford Chicago plant outstanding example—By *T. M. Rohan.*

◆ IS POOR plant lighting picking your industrial pocket? Lighting experts say it's not only possible, but probable.

They contend that about 75 pct of industrial lighting today is 25 years or more obsolete and will meet less than a third of established minimum lighting standards.

Even in new plants going up, lighting specialists say systems are held to budget minimums and plants are actually losing money because of it. It's worth looking into.

On the savings side, lighting engineers point to a well illuminated example in Ford Motor Co.'s Chicago aircraft engine plant which increased actual lighting 50 pct through a conversion system and showed $374,932 annual savings on maintenance over and above the cost of the new system.

Big Operation

Industrial lighting now uses 15 pct of the incandescent lamps and 30 pct of the fluorescent lamps made in the U. S. Incandescent production last year was 975 million bulbs at $325 million and 90 million fluorescent lights at $148 million value. Power consumption for industrial lighting has risen from about 13 billion kilowatt hours annually in World War II to 22 billion this year

Lighting engineers maintain that because of the wide variety of conditions to work in, labor rate variations, power costs and others, there is no rule of thumb for figuring out costs of an installation. One of the newest gimmicks, however, is having an outside lighting firm take over title and maintenance of new systems.

Parker Appliance Co., of Cleveland, recently resorted to this method resulting in continuous high level of light output, no capital investment in fixtures, lower taxes and insurance and no maintenance headaches. The contractor, C. & S. Lighting Maintenance Co., of Cleveland, handles all maintenance, cleans fixtures three times a year and group replaces the lights every 18 months.

Fluorescent lamps were "a godsend" during the war when they developed three times the light for the same amount of power. Because of their relatively high cleaning and maintenance costs, however, the newer incandescent and mercury built-in reflectors are increasing in popularity for shop lighting because they don't need cleaning and can be installed in existing sockets.

How Ford Did It

The actual savings at Ford of

Before

FORD MOTOR plant in Chicago is shown lighted with filament-mercury system. Room is dark and shadowy.

After

SAME PLANT with reflector system in old sockets has 50 pct more light. One year saving was $374,932.

$374,932 per year with 50 pct light increase were worked out with the aid of General Electric lighting engineers. The company was operating an 84-acre, under-roof plant with only about 20 ft cp of light available. Some supplementary lighting was used at machines and in inspection areas, but the overall light was insufficient. Existing filament lamps had to be changed 10 times per year at average life of 750 hours each and mercury lamps twice a year at 4000 hours life each. Total replacement cost was $398,740 per year, $242,500 of it in labor.

In addition, fixtures were cleaned twice yearly at $19,200 per year and in some cases dirt accumulation was causing a 4 to 5 ft cp dropoff 150 hours later. At average operating cost of $46,852 per ft cp the light loss was costing over $250,000 annually. There was also glare on shiny metal parts, poor color rendition and generally gloomy atmosphere which showed up in employee morale.

Boosts Morale

A new system of 500 and 750 w reflector type filament bulbs was installed in the existing wiring system and sockets in 15 minutes per bulb by a crew of two men. Cleaning and ballast replacement were eliminated, lamp replacement costs cut from $242,000 to $28,000 annually and although light output was up 50 pct, cost of power dropped $81,500 from $504,000 to $422,500. The intangible results are reduced employe eye strain and fatigue, good color rendition, and reduced absenteeism and complaints.

In Pittsburgh the Jos. T. Ryerson and Sons, Inc., warehouse eliminated all cleaning of light fixtures and extended replacement time from 1000 hours for incandescents to 4000 hours with new reflector mercury lights.

The Austin Co., Cleveland engineering and building firm, installed a new lighting system for its main drafting room shortly after World War II. A company official recently said of the system: "We consider it to be one of our best morale helpers and one of our soundest all-around investments. Also we believe good light is especially important in rooms where a fraction of an inch on a drawing will represent thousands of dollars of time and materials in the final construction." The system delivers 90-100 ft cp to the job or three times the original light level.

Cuts Accidents

U. S. postoffices in which each piece of mail is read 8 to 11 times set their lighting standards at 40 ft cp based on experience at the Richmond, Va., postoffice building, once the Confederate treasury. This pattern is now in use at new offices under construction. At Richmond, processing was speeded up 8 pct in two years following installation of the new lights.

The accident rate at Allis-Chalmers huge 60-year-old, 3-story high erection shop in Milwaukee was reduced 43 pct in a few years with the aid of a new lighting system and a coat of paint. The accident frequency dropped 32 pct with the new lights and 11 pct more with a coat of light blue paint on the ceiling and light green on the walls.

The Dept. of Internal Revenue in Washington, D. C., processed 5.5 pct more punch cards in a year at a 200 pct profit with new lights.

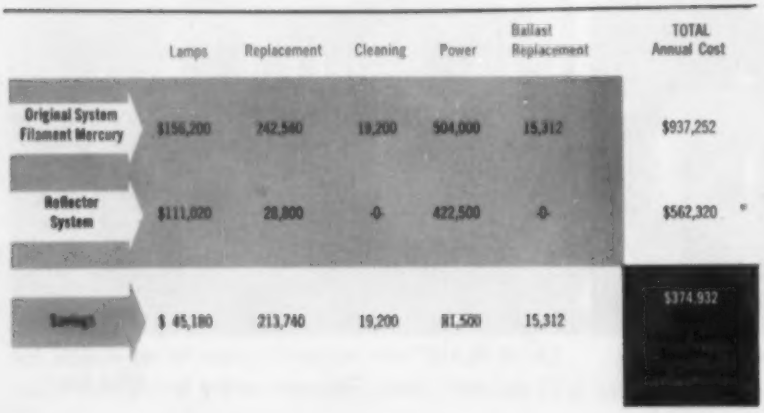
Faster Loading

At Alcoa's Cleveland works, vertical boring mill operators installed a 12 in. circular fluorescent light around the machine spindle for better visibility at the cutting tool's working position. With the new fixture, about 150 ft cp are thrown on the work without shadows. Special circular fixtures are also being sold for use on horizontal boring mills.

For faster and easier loading and unloading of trucks on gloomy docks, three systems have come into recent use. In one, the trucks are equipped with their own fluorescent lamps in the trailer with a 40 ft extension wire for plugging into dock outlets. In another there are lights suspended at the edge of the unloading dock which can be lowered and pointed directly into the truck bodies. In the third, spotlights are permanently fixed at the rear of the unloading platform to light the platform as well as the truck interiors. Riss Transportation Co. of Detroit gets about 100 ft cp on the rear truck area and 35 forward inside with 150-w reflector lights used this way.

Kasle Steel Co. of Detroit uses six 150-w floodlamps just above cutting blade of a large shear to minimize scrap loss through better visibility. A narrow beam is directed down onto the sheet through a slot between the shear head and machine face. The sharp shadow at the blade's shearing point enables the operator to quickly and accurately position the work for maximum control of trim.

What New Lights Saved Ford



CANADA: Tune In On Its Oil And Gas

Big money will be spent on Canada's oil and gas development . . . It will need pipe and equipment . . . New oil discoveries are in the offing . . . Present pipe capacity is limited, imports are necessary.

◆ BIG THINGS are brewing in Canada's burgeoning oil and gas fields. For U. S. equipment and pipe suppliers, it's something to keep an eye on.

Multi-million dollar pipeline projects are in the offing. Thousands of tons of electricweld and seamless linepipe must be supplied by U. S. producers, not to mention drill pipe, casing, and equipment.

The largest pipe rolled in Canada is 16-in. produced by Page Hershey Co., Welland, Ont. Larger pipe must be imported. Canada's first seamless pipe mill is under construction but won't begin operation until late next year. The $20 million mill, being built close by Algoma Steel Corp., Sault Ste. Marie, Ont., will have an annual capacity of 225,000 tons.

Canada's oil, gas, and water industries last year imported $17 million worth of casing alone—$11.7 million from the U. S., $2.6 million from United Kingdom, $1.5 million from Japan, and $1.2 million from Germany.

ANOTHER big oil pipeline job moves ahead in Canada. This one is being put into place outside Regina, Saskatchewan. It's inter-provincial line.

$300 Million Line Proposed

Two large long distance gas pipe lines are under consideration. The first is the Westcoast Transmission Co. line from Peace River area in Alberta and Northeast British Columbia to Vancouver and the Pacific Northwest area of the U. S. The second, though still in the discussion and planning stage, is the Trans-Canada pipeline from Alberta area to Central Canada. The Westcoast Transmission Co. line will be a 24-in. job.

The proposed $300 million Trans-Canada line would serve Central Canada. It would travel across Northern Ontario to Toronto and Montreal, with a branch line to serve Ottawa. It would be joined with the gas distribution system of Southwestern Ontario. One proposal mentioned officially would call for construction of a 30-in. line.

U. S.-Canada Link

Westcoast Transmission Co. has signed agreements with Pacific Northwest Pipe Line Corp., and El Paso Natural Gas Co., to deliver Peace River area gas to Pacific Northwest Pipe Line at Sumas near the British Columbia-Washington border. This gas would be used in the Pacific Northwest system in Washington and Oregon and by El Paso Natural Gas for feeding into the distribution system of Pacific Gas and Electric Co., in the San Francisco Bay area.

Pipe line plans would involve a 650-mile 30-in. line from Dawson Creek, B. C., to Sumas, Wash., to be built by Westcoast at a cost of $142 million; Pacific Northwest's 1450-mile, 22-to-26-in. line from Southwestern Colorado to join with the Westcoast line on the Washington-British Columbia border, and a line from Mountain Home, Idaho, to San Francisco to be built by El Paso Natural Gas Co. It's a $400 million project.

Oil-Gas Reserve Estimate

Authoritative sources indicate that new oil fields will be found in Western Canada. An oil find in Sturgeon Lake area east of Grande Prairie in the Peace River area has raised the possibility of a new outlet, perhaps a feeder line to the Trans Mountain oil line to the West Coast.

Oil reserves in Western Canada are estimated at 2.75 billion barrels and the proven gas reserves at 16 to 20 trillion cubic feet.

One leading official indicates that ultimate reserves will be much greater.

DISASTER

FLOOD: Brass Mill Battles Back

Flood battered and beaten, Chase Brass digs out . . . Operation well organized and around the clock . . . Manufacturers send experts to strip and clean clogged machinery—*By F. J. Starin*

◆ THIS IS a case history of a flood; how one company is fighting its way back after being hit by high waters that followed the visit of treacherous Hurricane Diane.

It concerns the Waterbury, Conn., plant of Chase Brass & Copper Co. But it could just as well be one of the many other industries that suffered heavy damage from the swollen rivers and streams.

Chase, whose plant sits close by the normally complacent Naugatuck River, is digging itself out. Even with hundreds of men and plenty of heavy equipment at work around the clock, it may be weeks before the plant returns to normal operation.

Menawhile, the company is doing what it can to take care of its customers. Its sister plant in Cleveland is working overtime to help fill the gap. Competitive companies are helping too, using raw materials supplied by Chase.

Fill Gulley First

What happened to the Chase plant may never happen again. But it points up an important consideration for industry when it comes to locating a plant: Is the location in a probable flood zone? Sometimes what looks like adequate protection against flood proves pitifully inadequate when nature goes on a rampage. A 20 foot retaining wall between the river and the Chase plant was literally ripped apart when the flood hit.

After the water receded the first big job facing Chase cleanup crews was removal of tons of debris, silt and muck in and around the plant. But even before this could get underway a 15-foot gulley between the plant and the main road had to be filled so that trucks and equipment could move in and out.

The flooring in the plant was wood blocks. What did not float away warped and buckled and must be included with the rubble to be trucked out. The Chase aim is to replace the entire 67-acre floor with one of similar construction.

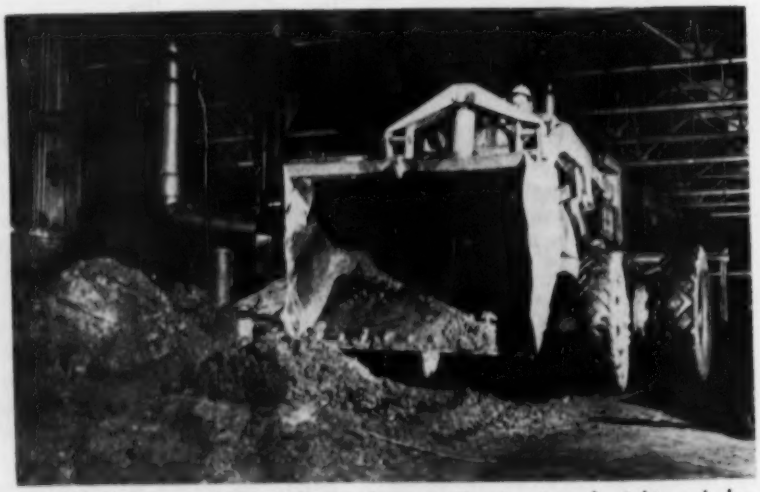
Sand and silt penetrated to the core of all machinery. As extrusion presses, slitters and other equipment are cleared, Chase men and experts from machinery manufacturers go to work. All equipment is dismantled and cleaned.

Power Plant Out

Motors 100 hp and less are trucked out to local contractors for cleaning and drying. Large motors are cleaned and baked on the spot. Estimates of the time required for this stage of the operation depend on how fast machines can be cleared of the debris and the extent of damage. For the larger, more complex several months will be required. The smaller and simpler will be ready to go in two or three weeks.

When the deluge struck the power plant literally blew. The water caused extensive short circuiting and explosions. Several eight-inch bus bars melted away. The entire plant is in process of being recabled. Auxiliary power is supplying enough juice to light the place for night work. Electricians and engineers are working 24 hours a day but completion of rewiring will take at least a month.

Most casting furnaces contained molten metal at the time and are scheduled for a complete relining as soon as debris clearance permits adequate working room. All other industrial furnaces will be ready to go in a week or so following a thorough cleaning.



EQUIPMENT normally used on road excavation is at work night and day in the water logged mill in an attempt to clear muck, sand, silt and debris away from machinery to let repair crews go to work.

coal stockpile had been brought up to some 40,000 tons. It was completely washed away. In its place: a pile of silt and sand.

Ironically, the problem of water for plant operations will be one of the last to be solved due to the magnitude of the job. The procedure has been to use river water run through a purification system. The entire system was knocked out.

Another big job is to put back in the proper location, equipment and machinery displaced but not destroyed by the flood. Giant pickling vats and other equipment were floated "downstream" for hundreds of feet.

Outside the building are scattered evidences of the crushing force of the raging water. Track of a railroad spur line leading to the plant was scattered and twisted rendering most of it useless except as scrap. A locomotive, used for jockeying freight cars in the Chase yards, was completely buried in sand and silt.

Independents Help

Since roads in the area are for the most part back in full use permitting trucking of raw materials into the plant and finished goods out, the track will probably not be ready for use until well after the plant has resumed production.

The company's fabrication shop, downstream and protected to a degree by the mill, was only slightly damaged. Machinery, on the whole, needs only minimum service and should begin to finish orders in process soon.

The Chase mill in Cleveland has stepped up operations to help supply customers normally dependent on the Waterbury plant. However, even the current six day work week can not produce enough to approach the required volume.

Independent mills not hit by the flood are cooperating by filling some of the orders on a subcontract basis with Chase supplying the raw materials.

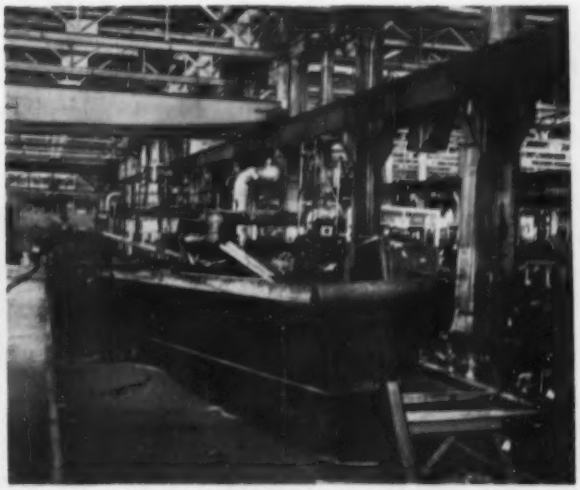
WHERE heavy equipment can't go men must, with shovels and barrels to clear away the heavy layer of muck.

FLOOD AID:

Government program at a glance.

- **Office of Defense Mobilization is exercising wartime emergency powers to get materials, equipment, power and transportation to stricken factories.**
- **Participants in huge loan program must certify that they will use the funds to resume production in the same area. However, they may move to higher ground or closer to power and transportation.**
- **Local small Business Administration offices have been instructed to cut red tape and issue loans up to $50,000 without delay. Only larger requests are referred to Washington.**
- **General Services Administration is selling copper from government stocks to distressed consumers in affected areas.**
- **Army is awarding contracts to industries in flood area and will supply production equipment where needed.**
- **Commerce Dept. has ordered copper producers holding government stockpile contracts to sell copper to fabricators in damaged areas.**
- **Warnings have been issued against phony repair contracts.**

TRACKS and crossties from a spur railroad line leading into the Chase mill were ripped up and twisted, now good for nothing but scrap.



GIANT pickling vats and just about any piece of machinery not bolted to the floor was carried hundreds of feet to the other end of the plant.

MARKETING

TUBES: Squeeze More Than Toothpaste

Production hits new high in first half of 1955 . . . Toothpaste still leading item . . . But trend is toward greater variety including food products, paint colorants and other items.

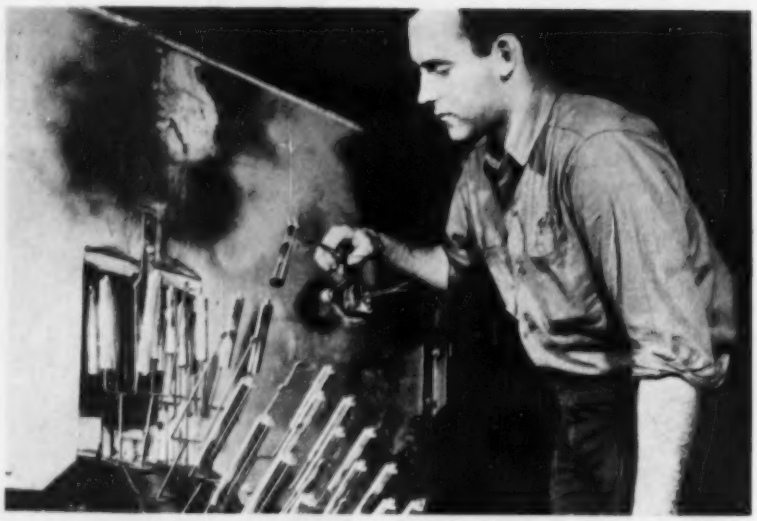
◆ AMERICANS, used to squeezing their toothpaste and shaving cream from collapsible metal tubes, may soon handle many more items in this manner.

Toothpaste is still the big tube user, taking 245 million units of a half-billion total for the first six months of 1955.

American packagers have been slow to push tube use in the past because of production costs. Collapsible tubes are fabricated by impact extrusion.

Metals generally used are lead, tin and aluminum. In the first half of this year tubes took 7,902,348 lb of lead, 3,606,658 lb of aluminum and 663,844 lb of tin.

Material and production costs are still relatively high. But today's emphasis on easy handling is swinging packagers around to broader use of tubes. Paints, putty and jellies are among products now going into collapsible metal containers.



THE KEY step in the production of a collapsible aluminum tube following the ram-and-die impact extrusion is a trip through the tempering oven.

Food Men Explore

Already available on the market are tubes of apple-raspberry jelly packaged by C. H. Musselman, Biglerville, Pa. The new approach was field tested in a rural section of Pennsylvania where demand could be expected to lag. Reports indicate an acceptance beyond that which was expected.

As a result growers and processors have been exploring the possibility of metal tubes for fish, meat and cheese spreads, peanut butter, mustard, ham glaze, mayonnaise, catsup, condensed milk and just about any product which can be processed into a paste or heavy liquid form.

Keeps Putty Soft

The Goodell Co. in New Hampshire has come up with a kit designed specifically for the do-it-yourself handyman. The main component is a collapsible metal tube of putty. A new method of preventing oil separation makes this packaging technique possible. The tube features a triangular shaped head through which the putty is squeezed. Shape is ideal for installing windows. Packaging cost is higher than conventional cans but putty stays usable indefinitely.

Paint colorants in tubes are being accorded wide recognition by manufacturers who can now make few basic colors, distributors who pay lower shipping costs, dealers who stock larger inventories on less shelf space and housewives who want exactly the right shade.

As many as 1300 different shades and tints are shown on small wood chips. When the customer selects her color the dealer need only flip the chip over and the key on the reverse side will indicate what combination of the tubes will give exactly the desired effect. These are added to the neutral or base paint in the required quantity.

See Supplies Ample

There seems to be ample lead and tin available for tube manufacture. Although aluminum is tight generally, two factors combine to minimize this problem for tube makers. Initially, the collapsible metal tube manufacturers require a high purity aluminum for which industrial demand is less imposing.

Secondly, ALCOA is actually a member of the industry with a plant at Edgewater, N. J., and stands to profit by the growth of the industry.

Estimated early output will be about 972 million units, topping last year's output by over 144 million.

TAXES: No Cuts Likely For Business

Boom puts U. S. within $1.7 billion of balanced budget . . . Prospect stirs tax cut talk by both parties . . . Election considerations point to big slash for individuals, little relief for business.

◆ LEADERS of both parties are honing their tax cutting knives for next year and, with one eye on the 1956 elections, are already courting the "little guy." Corporations are going to have to depend on a "trickle up" for any major benefits.

Flushed at the prospect of the first balanced budget in 4 years, politicians will soon be stumbling over each other in the rush to pare personal income taxes. Final result may be a heftier slice than either party is planning as the Republican Administration and the Democrats in control of Congress vie to claim credit for the tax relief.

But the 52 pct corporation rate, scheduled to slide to 47 pct next April 1, will probably be extended at the high rate for another year. Best business can hope for is that excises on automotive products and some others will be permitted to drop as scheduled.

Revive Blanket Cut

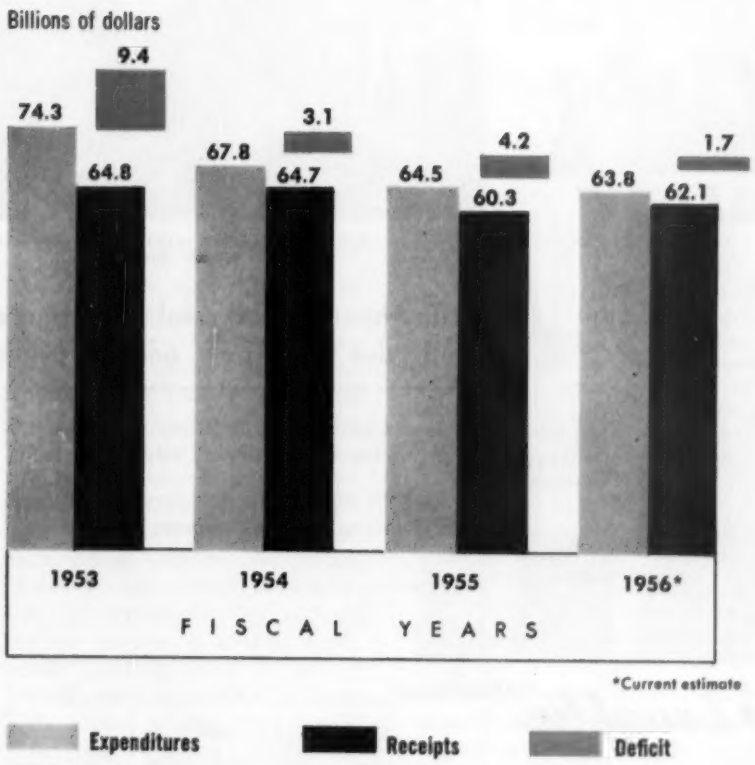
Some lawmakers are talking of cutting the corporation tax to 50 pct, but chances are this proposal will be drowned in the flood to cut personal levies.

At least two proposals are already being tossed around in Democrat circles. One is a revival of this year's unsuccessful attempt to cut all personal taxes by $20. Another is to increase the personal exemption by $100 or $200. A third possibility may be to give every taxpayer a percentage cut in taxes, probably about 10 pct.

Complaints that these actions will remove thousands of taxpayers from tax rolls, won't have much effect.

Behind tax-cutting talk is elections, balanced-budget outlook.

The Budget Story



MILITARY BUYING BOOMS

▪ Outlook for military ordering in the current fiscal year is for an increase over last year's $16 billion, although Pentagon chiefs won't make an official estimate until mid-November.

▪ By major categories, here's the trend contract letting by the military is expected to follow in the next 10 months:

▪ Navy—Ordering for both aircraft and for new ships is expected to climb over this year's rate.

▪ Air Force—Biggest increase in order-letting in recent years is in prospect as contracts for new aircraft and guided missiles pour out.

▪ Army—Contract letting by the Army will decline in the months ahead, offsetting some of the increases in the other two services. But chances are it will not wash out all of it.

FACING A TOUGH PROPOSITION?

you can beat it with *JALLOY*

Only a seasoned hunter with the right equipment can stand up to a charging rhino. And, likewise, only a special steel like JALLOY can withstand severe impact and abrasion . . . day after day. In comparison with mild steels as well as other abrasion-resistant steels, JALLOY gives outstanding results when heat-treated to your specifications.

This modern heat-treated plate brings savings in steel costs, maintenance, and repair, and also is easily welded. JALLOY is available in three grades, each of which is designed for specific applications.

J&L STEEL

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy heat-treated steel plate beats wear due to impact and abrasion

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 403, Pittsburgh 30, Pa.

☐ Please mail complete data concerning Jalloy.
☐ Please have your representative call.

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City _____ Zone ____ State _____

CERAMICS: From Jewels to Tools

Two new processes speed application . . . Use of refractory metal oxides effective tool protection . . . Armour, Battelle Research groups spur search for new methods—By *D. G. Picinich.*

◆ CERAMIC COATINGS — used for over 1000 years by skilled artisans in jewelry decoration, and during the last century in the enameling of iron and steel—are one of today's key industrial tools in helping to protect metals against elevated temperatures, corrosion, abrasion, oxidation, and wear.

Both Armour Research Foundation, Chicago, and Battelle Memorial Institute, Columbus, Ohio, are active in current and future applications for ceramic coatings of direct importance to the metalworking industry.

At Armour, for instance, the "solution" ceramic process and "flame" ceramics process have been developed to a fine point within the last four years.

Basically, solution ceramics consist of spraying carefully balanced solutions toward a hot surface. The heat evaporates the solvent and dissociates the solute. The coating which is formed is simply the residue of the solution.

Temperature Factors

Coatings are non-brittle, can be applied to almost any clean, solid surface at a few hundred degrees F. Solution ceramics contain no bonding agent such as are found in other sprayed ceramic coatings.

For most of the solutions tested, application temperature is 400-700° F. Adherent coatings have been obtained by Armour researchers at temperatures as low as 300°F—and as high as 1200°F. One remarkable feature claimed for the process is that zirconia, whose melting point is nearly 5000°F, can be applied to materials heated to less than 500°F.

Solution ceramics coatings intensively studied at Armour include such refractory metal oxides as zirconia, chromia, titania, ceria, and magnesia. But the process isn't limited to such compounds. Certain phosphates, silicates, fluosilicates, oxyhalides—and even metals—can be deposited in this way. Two or more of these materials may be co-deposited or applied in separate layers.

Armour's more recently developed flame ceramics process allows for the coating of a wide variety of metals. The process "feeds" powdered ceramic materials through a simple flame gun. Coatings are said to be superior to those produced by the metallizing processes because of their greater chemical stability and resistance to heat effects.

Aluminum oxide and zirconium oxide are the two basic flame spray ceramic coatings.

Alumina coating hardness, say researchers, also suggests future uses in protecting soft metals such as die-cast alloys or mild steel, against erosion and abrasion in pump impellers and housings, fan blades and turbines, and piping subject to cavitation.

The flame ceramic process has already shown some value for thermal protection of engine parts, protection against increasing wear of metal treads and gratings, as a "wettable" coating for oil burner pans and grates, and as anti-heat protection for aircraft parts.

ORDINARY paint sprayer may be used to apply "Solution Ceramic" as demonstrated by Samuel W. Bradstreet, co-inventor of process. At right, inside of rocket tube is coated by technician at Armour Research Foundation.

Leading a Dog's Life..?

ARE YOU IN THE DOG HOUSE BECAUSE OF GRINDING WHEEL PROBLEMS? Then switch to CINCINNATI (PD) WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

Here's how CINCINNATI (PD) WHEELS can put a twinkle in your eyes and a smile on your face: through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, let us help you get out of the dog house and lead a normal life again. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you...

(PD) POSITIVE DUPLICATION.

CINCINNATI
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

New Tooling:

U. S. prepares forced-draft expansion of industry.

The government is preparing to spend $70 million in a forced-draft expansion of steam turbine and turbine gear production capacity.

So-called "expansion goals" for the turbine and turbine gear program have flopped badly. The lure of fast amortization for new production facilities has resulted in only a few nibbles and only a small fraction of the desired new capacity.

Under the forced-draft expansion program announced by the Office of Defense Mobilization, eight different machinery manufacturers will expand their capacity for manufacturing steam turbines and turbine gears.

Where possible, the new tools and equipment will be supplied from government inventories. In cases where this is not possible, the tools and equipment needed in the expansion program will be purchased in the open market.

Lack War Capacity

The eight firms participating in the new program are Allis-Chalmers Co., DeLaval Steam Turbine Co., Elliott Co., Falk Corp., Farrell-Birmingham Co., General Electric Co., Newport News Shipbuilding and Drydock Corp., and Westinghouse Electric Corp.

Existing capacity is adequate for present-day needs, but is far below what will be needed under full mobilization conditions. And to delay expansion until M-day would only result in a critical mobilization bottleneck that could not be broken for several years under wartime production schedules.

Review List

The list of machine tools and equipment needed in the new expansion program is being reviewed by the Defense Dept. and the Business and Defense Services Administration.

General Services Administration will supply as much of the needed equipment as possible out of its inventory. Equipment not in the GSA inventory will be purchased. GSA also will arrange with the eight contractors for maintenance and storage of the tools and equipment on a standby basis.

The eight contractors will be required to buy or lease the equipment at any time it is placed in operation.

Weak Link:

Clear telegraphic wires for defense messages.

Telegraphic communication, the unexpected weak link in the recent civil defense "alert" exercises, is to be subject to a rigid priority system in any real or staged defense crisis of the future.

Covers Wire Only

All business and industrial communications moving by public telegraph (Western Union) will be affected by the precedence system.

Firms holding defense contracts will be among the privileged groups entitled to high-priority handling of their telegraph messages.

If you don't hold a defense contract or subcontract at the time disaster strikes, Western Union offices are under orders to keep your messages at the bottom of the pile until all "priority" traffic has been sent over the wires.

Under present plans, only Western Union traffic is to be subject, under crisis conditions, to the traffic-precedence system. Other wire communication, such as telephone, leased-line teleprinter service, and teletypewriter exchange (TWX) service, is to be covered by separate rules still in the drafting stage.

All messages slugged EMERGENCY are transmitted ahead of all other wire traffic.

"IMMEDIATE" messages are transmitted after all "EMERGENCY" traffic has been cleared.

Lowest grade of priority, "RAPID," may be applied to news of health, food, safety, etc.

Takes Research Post

New weapons and equipment planning for the Army will be supervised by William H. Martin, former deputy Asst. Defense Sec. for applications engineering.

Mr. Martin, just named by the Army as director of research and development, was a vice president of Bell Telephone Laboratories from 1949 until January, 1954, when he accepted the Defense Dept. post.

He will have complete authority over Army research and will report to Army Secretary Brucker.

CONVERTIBLE: Bell Aircraft Corp.'s new XV-3 ascends 30 ft in test flight. Pivotally mounted rotors permit helicopter or conventional operation.

EXPANSION IN INDUSTRY

Test Reactor:

AEC to spend $15 million on new Idaho unit.

Atomic power development programs in progress in early 1957 are to be assisted by a new engineering test reactor to be built at the national reactor testing station near Idaho Falls, Ida.

The new reactor, says the Atomic Energy Commission, will compensate for present facilities not suitable for the planned experimental work. AEC is to pay the $15 million estimated cost.

Ask Other Bids

Architectural engineering work on the project will be done by Kaiser Engineers, Inc., Oakland, Calif.

AEC is asking for bids on building a second reactor at the Idaho site. This is to be a small unit for testing reactor cores. Its estimated cost is between $250,000-$500,000. It will be a high pressure water-moderated and water-cooled type.

Companies indicating interest in the project to the AEC Reactor Development Div. will be invited to offer proposals late in Sept. for delivery in mid-1956.

Spend $1 Million

Allegheny-Ludlum Steel Corp., Pittsburgh, is planning a $1 million expenditure on plant development of its facilities at Dunkirk, N. Y. The project will include the company's titanium-steel alloy division.

The construction program will be the first major building project in Dunkirk since the Brigham plant was built by the Federal government during World War II.

Expand HQ Facilities

Union Carbide & Carbon Corp. has completed plans for erection of a modern 41-story office building to be located between Park and Madison Aves., and 47th and 48th Sts., New York.

Slated for occupancy some time in 1958, the new structure will serve as headquarters for the Corp., its divisions and subsidiaries.

The new building will consolidate home office operations of such divisions and subsidiaries as Bakelite Co., Carbide & Carbon Chemicals Co., Electro Metallurgical Co., Linde Air Products Co., National Carbon Co., and Union Carbide Nuclear Co.

Titanium Pigment Plant

National Lead Co. through its subsidiary Canadian Titanium Pigments Ltd., has announced plans for construction of Canada's first titanium pigment plant. Production in the plant at Varennes in Quebec is expected to begin in 1957 and will be designed to meet the entire Canadian requirement for titanium oxide. The cost will be about $15 million.

Boosts Output Facility

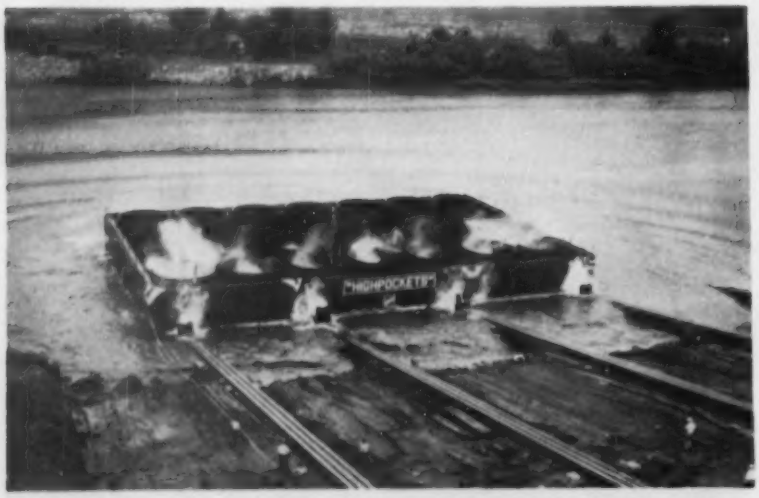
Jarecki Corp., Grand Rapids, Mich., has completed plans for a plant development and new equipment purchase program estimated to cost approximately $1.2 million. The die and stamping firm primarily serves the automotive and appliance industries.

Enlargement of the plant used for welding, metal fabrication, and assembly will amount to an additional 58,000 sq ft of floor space. It will include two production bays to accommodate larger presses and cranes.

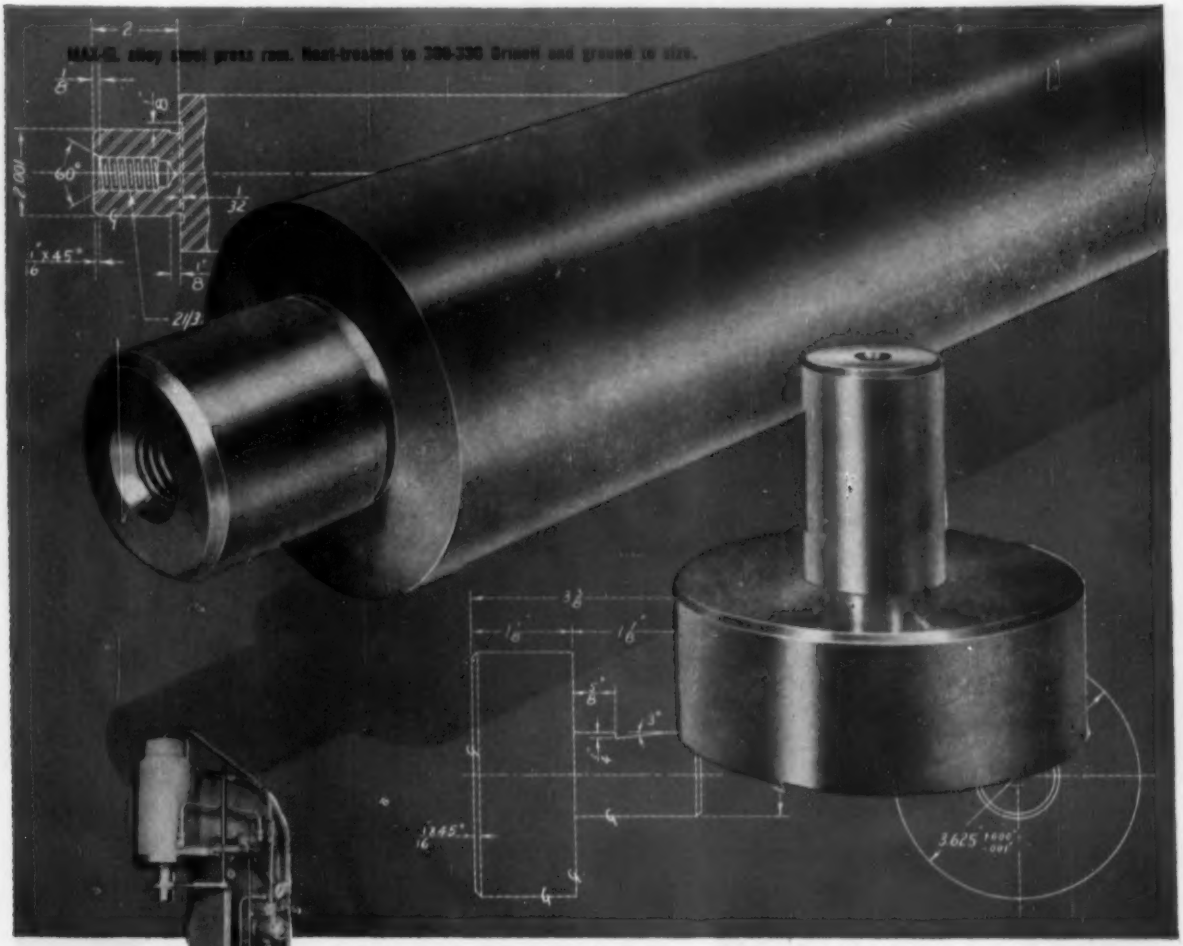
Sell Chemical Plant

Union Carbide & Carbon Corp. is the new owner of an Ashtabula, O., chemical plant built in 1941 and placed in standby status by the government nearly 3 years ago.

Auction sale price of the 52-acre facility, with machinery and equipment, was $405,000. It was built at a cost of $3.5 million.



HIGHPOCKETS, a 500 ton steel caisson constructed by the Dravo Corp. hits the water in the Ohio River at the beginning of its 1850 mile journey downstream to New Orleans where it will be sunk to become the bottom of the foundation for a new $65 million bridge.



MAX-EL Alloy Steel means no distortion—longer wear in 15-ton hydraulic press ram

To keep this 15-ton press operating day after day for years of dependable service, takes *special* steels. For example, even after thousands of cycles of operation, the ram *must* remain accurately in line with the work table. *It demands a steel that will not distort, set or wear.*

That's why both the ram and ram-plug are made of Crucible MAX-EL alloy steel. In fact, the manufacturer, Greenerd Arbor Press Co., Nashua, N. H., has been a steady user of MAX-EL for many years.

Here's what they have to say—*"We have tried many grades of steel, but we find that MAX-EL 3½ heat-treated in the bar works out better for our application."*

And it probably will for yours, too. So when you have a job calling for a non-deforming alloy steel—one with excellent machinability, high-strength and wear-resistance—try Crucible MAX-EL. It's promptly available from your nearby Crucible warehouse, in the sizes and grades you need. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Write for your free copy of this Crucible Publication Catalog listing dozens of helpful booklets and data sheets.

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Downtime and the labor cost of replacing worn-out tubing made of common materials can be a great deal more expensive than the extra first cost of long-lasting stainless.

The tube failure pictured is a dramatic reminder of the indeterminate, and usually shorter, service life of tubing which may bear a smaller price tag, but whose *total* cost can be measured only after the ravages of time and corrosion have tested its durability.

For optimum strength, corrosion resistance and oxidation resistance, there's a stainless grade, size, heat treatment and finish best suited to your particular pressure and temperature requirements. Ask Mr. Tubes, your link to B&W, how to get more for your money with stainless. *Or write for Bulletin TB-356-IA.*

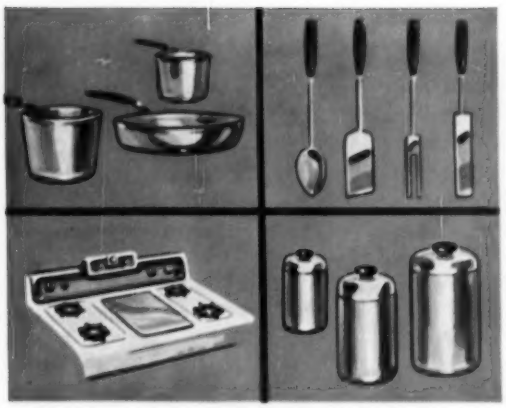
B&W TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5038(P)

modern design specifies stainless steel

McLouth
STAINLESS
Steel
for the home

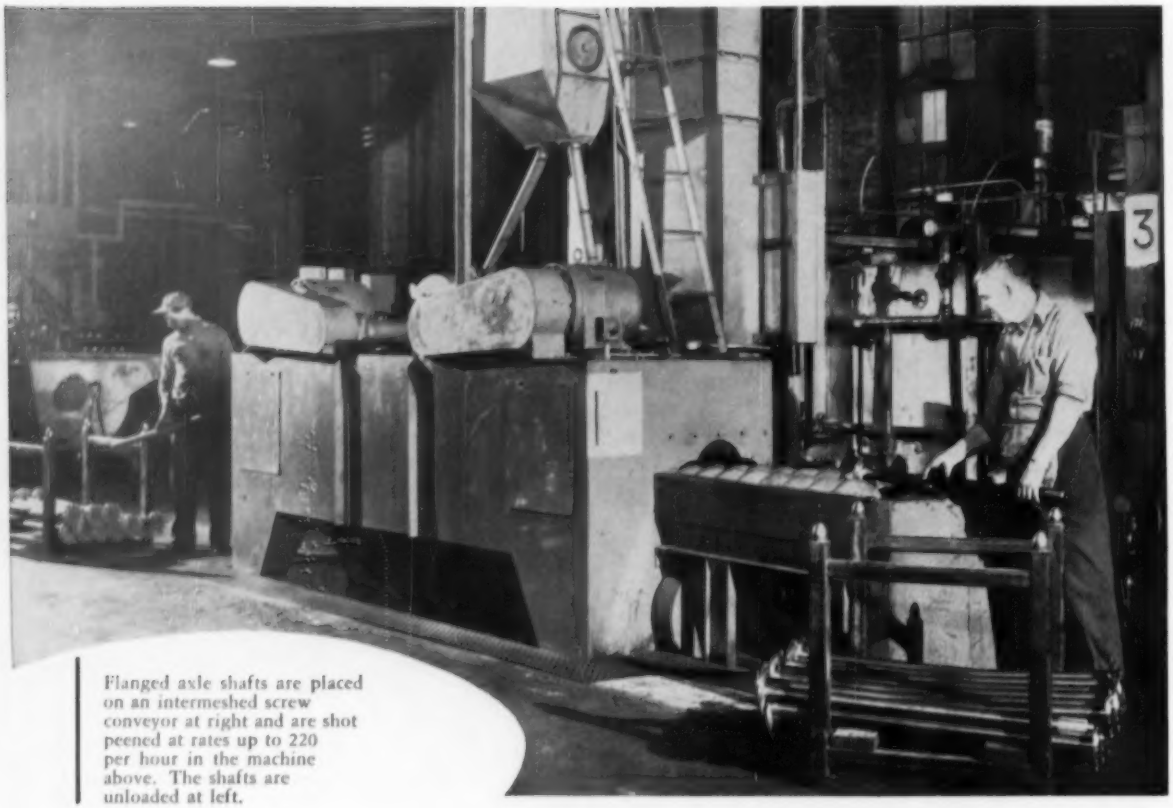


The lady agrees with the architect that her modern, cheerful, Stainless Steel kitchen will be the most beautiful room in the new house. Stainless Steel is the bright, long lasting metal that will not tarnish, is easy to clean and a joy to live with.

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

McLouth Steel Corporation
Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS



Flanged axle shafts are placed on an intermeshed screw conveyor at right and are shot peened at rates up to 220 per hour in the machine above. The shafts are unloaded at left.

WHEELAPEENING HAMMERS LIFE INTO AXLE SHAFTS AT DETROIT BEVEL GEAR COMPANY

Auto makers specify shot peening to increase fatigue life of parts

Tests by leading automotive manufacturers have proved shot peening will increase fatigue life of axle shafts up to 1900%.

With shot peening virtually eliminating axle failure in normal service, passenger car and truck manufacturers now specify such peening by their suppliers.

Detroit Bevel Gear Co. has found a Wheelabrator cabinet is the answer for peening in sufficient quantity to meet the demands of high-volume production. Up to 220 axle shafts an hour are shot peened in the Wheelabrator.

To assure that peening in production is uniform and as specified, a special test axle shaft on which two Almen test strips are affixed, is passed through the machine at certain intervals. Tagged and filed, these strips are proof to the customer that the peening arc height has been kept within specified limits for the entire run.

Although the machine was installed especially for peening, its high speed also permits cleaning rough forgings at rates up to 245 an hour, compared with 30 shafts cleaned in the same time previously in a batch type blast mill.

To learn more about the Wheelabrator and how it provides faster and better production, write today for Bulletin No. 74-B.

WHEELABRATOR
CORPORATION

(Formerly American Wheelabrator & Equipment Corp.)

510 S. Byrkit St., Mishawaka, Indiana

Trail Blazer of Industrial Progress

Report to Management

Where Did the Summer Go?

You can ask that question in more ways than one. The hot weather is almost over and few of the seasonal factors usually attributed to summer have appeared in the business cycle.

Business continued its uptrend long after a seasonal slump was predicted. In fact, no slump or slackening in the terrific economic rate appeared at all. Record setting pace of business that characterized the first half of the year failed to wither in the heat of summer.

Personal income remained over the $300 billion seasonally adjusted rate. Employment continued to gain and remained at or near the 65 million level. Retail sales moved ahead—in July were 2 pct over the record rates of May and June.

That's why your business kept booming through the summer to the extent that you scarcely had time for a vacation or many, if any, of those long week ends.

Economists show charts of disposable income and call it the big factor in the strength of consumer expenditures. At the same time, consumers have been willing to spend more, but save somewhat less.

Rise in consumer credit is the joker. Some economists point to it with alarm. Others say easy credit is the big factor in creating the demand for consumer goods. The answer is somewhere in between.

Recent economic curbs such as higher home down payment, shorter mortgage periods, did little to stem the tide of home buying. In fact, some increases were noted shortly after stricter terms went into effect. Auto credit buying gets most of the blame, but repossessions continue to be negligible.

Are There 80 Million Jobs?

Forecasters and planners are unanimous in citing the baby boom of the 40's, which continues into the 50's, as a solid reason for predicting future decades of prosperity. Logically, babies will grow into consumers, form more families, and result in a huge potential demand for goods.

Supposition is that all will find work to provide the means to satisfy this demand. It begins to look like this is going to be the problem of the future. Government economists predict that there will be a labor force of 80 million in another ten years.

Worker productivity is gaining at the same time, adding that complication. Worker productivity has jumped an average of 4 pct per year in the first decade after World War II, with the rate in the past two years somewhat higher than that.

A Stitch in Time

Among the many lessons learned the hard way in the recent flood was that of assuring safe keeping of records. Many companies, after sweeping out mud and debris, found their records and books either gone completely or damaged beyond recognition.

Loss of records is crippling to a company, as much as severe property damage. The answer lies in making sure records are in a secure, water, fire and other damage proof location. Trend to microfilming necessary documents and records is a good one.

Watch Washington for Flood Procedure

How to deduct flood losses on personal and corporation income tax returns will be blueprinted in the weeks ahead. The Internal Revenue Service is preparing a special pamphlet on the subject. Copies should be available in November.

INDUSTRIAL BRIEFS

10 Million Motors . . . The 10 millionth appliance motor to be produced at General Electric Co.'s De Kalb plant came off the production line two weeks ago. Company's goal is to hit 20 million motor mark by 1959, 50 millionth by 1970.

Begins to Operate . . . Normal operations on Wheeling Steel Corp.'s $4 million continuous galvanizing line, located at the company's Martins Ferry, Ohio, plant began last week. This is Wheeling's second line at Martin's Ferry; the first installation went into production in Nov., 1953.

Adds More Space . . . A new 9000 sq ft addition is being made to the plant of Federal Tool & Mfg. Co., Minneapolis, Minn. The addition will house new equipment, and stock room facilities for raw materials will be increased when the addition is completed in September.

Another Sales Rep. . . . Southwest Industrial Sales Co., Dallas, Texas, has been appointed representative of the Pratt & Whitney Div., Niles-Bement-Pond Co., for the North Texas area. Company will handle all sales and service of the Pratt & Whitney line of products.

Sales Distributors . . . Barry Controls, Inc., Watertown, Mass., announced the appointment of Kent Rubber Supply Co., Grand Rapids; W. J. Laise Co., Louisville; Manufacturer Supply Co., Chicago; and Mau-Sherwood Supply Co., Cleveland, as industrial distributors for their line of machinery mounts.

Furnace Orders Up . . . Orders for furnaces and control equipment for July, 1955, bettered the record of a year ago by almost three times. The figure for July, 1954, on net orders received was $1,664,029. For 1955, order figure soared to $4,356,266.

New Sales Office . . . Kaiser Aluminum & Chemical Sales, Inc., has established a new sales office at Hartford, Conn., to handle the firm's growing business in Conn. and western Mass.

New Offices . . . Effective Sept. 15, THE IRON AGE offices will move from New York to a new building at Chestnut & 56th Sts., Philadelphia 39, Pa.

Buys Out Plant . . . R. Hoe & Co., Inc., announces the acquisition of the plant of the Carolina Saw & Tool Co. The plant will be the nucleus of greatly expanded operations and will be known as the Carbide Saw & Tool Div., Hoe Co.

New Subsidiary . . . Western Carbide Corp. has been formed as a subsidiary of Superweld Corp., No. Hollywood, Calif. Corporation will manufacture and market proprietary products.

Supply Store Opens . . . The National Supply Co. has opened a new oil well equipment and supply store at Sterling, Colo. Store will serve drillers and producers in Logan, Sedgwick, and Phillips counties, Colo.

Canadian Railway . . . A joint contract for work on the first 66 miles of the new Canadian National Railways line from St. Felicien to Chibougamau has been awarded to Therrien Construction Co., Ltd., and McNamara Construction Co., Ltd.

$5 Million in Awards . . . More than $5 million in new contracts for airframe parts and jet engine components, including increases in its work on highly classified projects, were awarded Ryan Aeronautical Co. during the past month.

Export Giant Tractor . . . Caterpillar Tractor Co.'s biggest tractor, the "Cat D9," weighing over 30 tons, was shipped from the Port of Baltimore to Gothenburg, Sweden, where it will be of assistance in harvesting pulpwood for Sweden's paper industry.

Appoints Reps. . . . Schroeder Brothers, Pittsburgh, has recently been appointed western Pennsylvania and West Virginia representatives for Rivett, Lathe & Grinder, Inc., Boston, Mass.

Purchases Plant . . . The George L. Nankervis Co. announced it has purchased a 72,000 sq ft manufacturing plant formerly occupied by the Nash Div., American Motors Corp.

Warehouse Contract . . . Luria Engineering Co., Bethlehem, Pa., has been awarded a contract to construct a 10,000 sq ft warehouse in Harrison, N. J., for National-U. S. Radiator Corp. of Johnstown, Pa. The structure is scheduled for completion in Sept.

Reactivation . . . Newport Steel Corp. announces the reactivation of its blooming and bar mill in Wilder, Ky., about the 1st of Oct. Reason for the extensive reconditioning and resumption of production is given as increased product demand.

Every 3 seconds—a heated bar with this Magnethermic 10,000 cycle Induction Heater

This 10,000 cycle unit preheats 1" steel bars to 2300 degrees for upsetting at rate of one every 3 seconds or over 1,000 per hour.

Induction preheating for forging or extrusion has many advantages: speed, economy, cleanliness, close control, adaptability, increased die life and attractive working conditions.

But the question of which frequency—low, dual or high, sometimes confuses the issue. Each has its own place and its advantages.

Magnethermic makes induction heaters only, 60 through 10,000 cycles, and can give you experienced guidance on selecting the best frequency for your heating job.

Low—Dual—High Frequency?

ASK MAGNETHERMIC

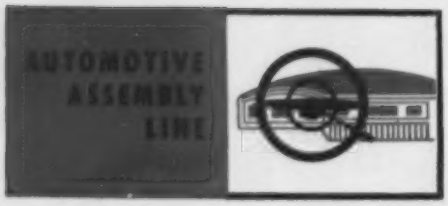
INDUCTION HEATING

MAGNETHERMIC

corporation

3990 SIMON ROAD . YOUNGSTOWN 7, OHIO

60 THROUGH 10,000 CYCLES



New Company Taps Sports Car Field

Dual Motors hopes to break even on new car . . . Won't challenge big companies, but thinks it has market potential . . . Body built in Italy . . . GM shows diesels . . . New safety emphasis—*By T. L. Carry.*

• THERE'S a fledgling automobile company in Detroit that probably will never give the Big Three a competitive headache. But the people who work for it are going to have a lot of fun producing one of the best looking sports cars ever seen here.

Dual Motors Corp., headed by Eugene Casaroll, will go into production in November on a brand new 4-passenger sports car which is appropriately called the Firebomb.

The car will never be produced in mass quantities and, although Mr. Casaroll figures he won't make any money on the project, he's going to have a good time breaking even.

Italian Body . . . There are several new features in the car which set it apart from other "standardized" sports models.

Everything but the body will be produced in this country. Frames will be shipped from the Dual Motors plant to Italy. There, at the plant of Carrozzeria Ghia in Torino, bodies will be attached to the frames and shipped back to Detroit.

Dual Motors will complete assembly of the car at its plants in Detroit and Coldwater, Mich.

The Firebomb will carry four passengers, unlike most other sports cars on the road today which will have room for only two people. The last 4-passenger sports car produced in the United States was the Willys Overland Jeepster and production on that model was abandoned in the late 1940's.

Dodge Engine . . . Mr. Casaroll sees a distinct advantage in having all the car's components except the body made in the United States. "A person owning a foreign sports car sometimes has to wait for months for parts to be shipped from Europe in case repairs are needed," he said. "Replacements will be much easier here," he added.

The Firebomb will be powered by a modified Dodge Red Ram V-8 engine which will produce 225 hp. It will have a top speed of 140 mph and weigh 2800 lb.

Wheelbase of the new car is 115 in. and its overall length is 203 in. It is 52¼ in. high and has a ground clearance of 5⅝ in.

Equipped with power brakes and standard American suspension, automatic transmissions will be available as optional equipment because, according to Mr. Casaroll, most sports car enthusiasts prefer standard shifts. The car will cost between $5500 and $6000.

SAFETY BELTS will join the list of extras offered with Chrysler and Imperial automobiles in 1956.

Prototype Shown . . . Initial production of the Firebomb will be on a limited basis. Because of its custom features, Mr. Casaroll has decided to limit the output to 150 cars for at least the first year. The units will be made of steel because experiments have shown that plastics are too expensive even on a limited basis.

A prototype model of the Firebomb made its debut at the Geneva International Automobile Show in Switzerland last spring. Following the exhibit, the car was shipped to Detroit where it is presently stored at the Dual Motors plant.

Mr. Casaroll has been known for years for his entries in the Indianapolis 500-mile races. His chief aide in the Firebomb venture is Paul Farago.

Dual Motors has been engaged in various motor projects for the government for several years. It is a subsidiary of Automobile Shippers, Inc., an auto transport company.

Change Sales Setup

Chrysler has announced plans for the gradual development of separate dealerships for the Plymouth, Dodge, DeSoto and Chrysler divisions. According to L. L. Colbert, Chrysler president, the new dealerships are going to be developed where local conditions make them practical.

Main reason for the change in the distributing system is deeper penetration of the market. Chrys-

NOW IS THE TIME . . .
and here is the way!

To Reduce Manufacturing Costs with a . . .

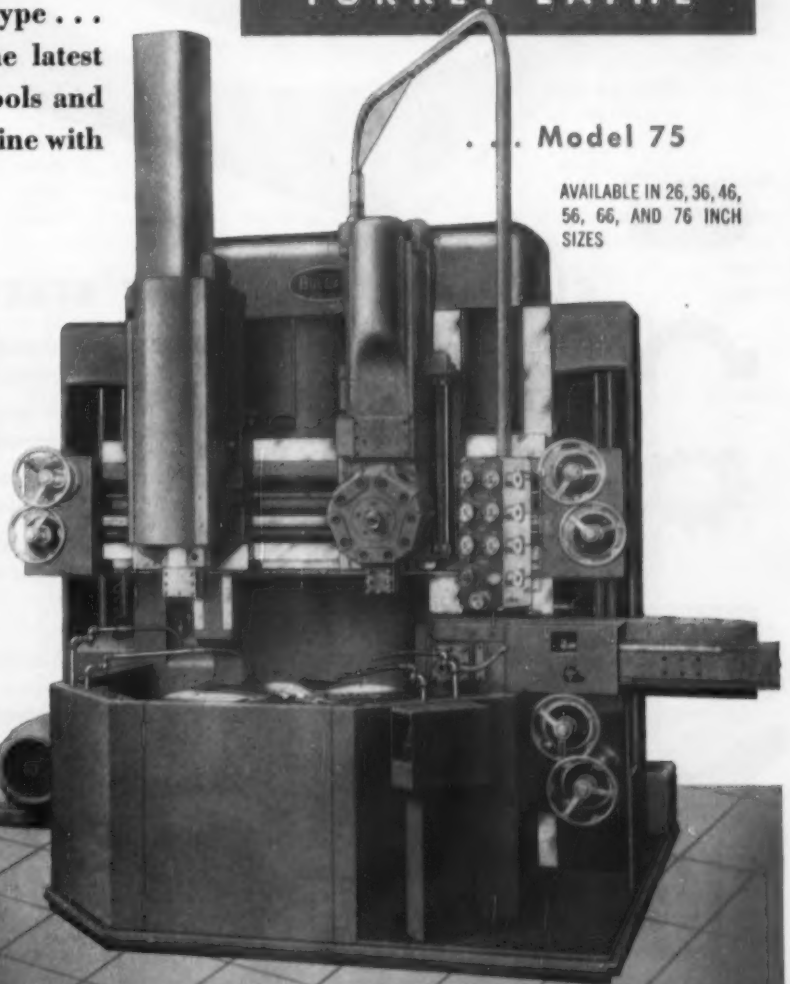
SEVENTY FIFTH BULLARD ANNIVERSARY 1880 1955

CUT MASTER
VERTICAL TURRET LATHE

This revolutionary new design of vertical turret lathe has exclusive features never before offered on machines of this type . . . takes full advantage of the latest improvements in cutting tools and methods . . . truly the machine with a "built-in" future.

. . . Model 75

AVAILABLE IN 26, 36, 46, 56, 66, AND 76 INCH SIZES



PENDANT CONTROL . . .

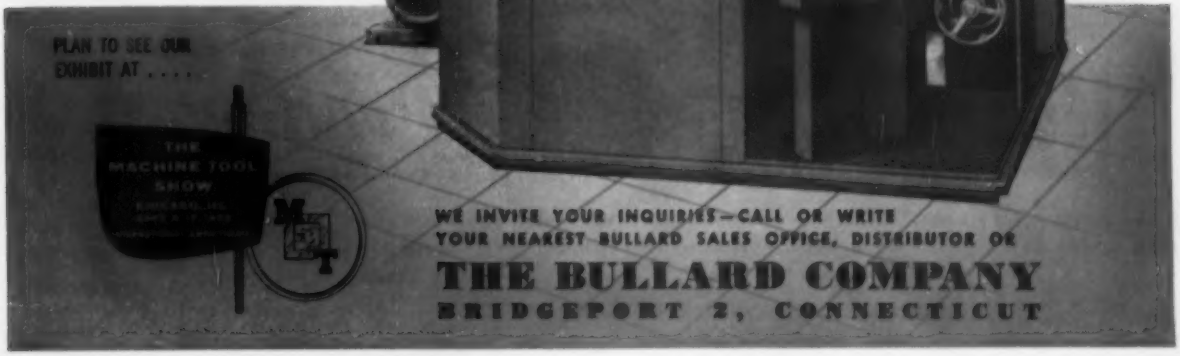
provides maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stopall stick provide safety for both operator and machine.

SCREW FEED . . .

is provided for vertical and horizontal motion of all heads—to assure fine, smooth finishes with greater accuracy.

POWER INDEXED MAIN TURRET . . .

(Optional) Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

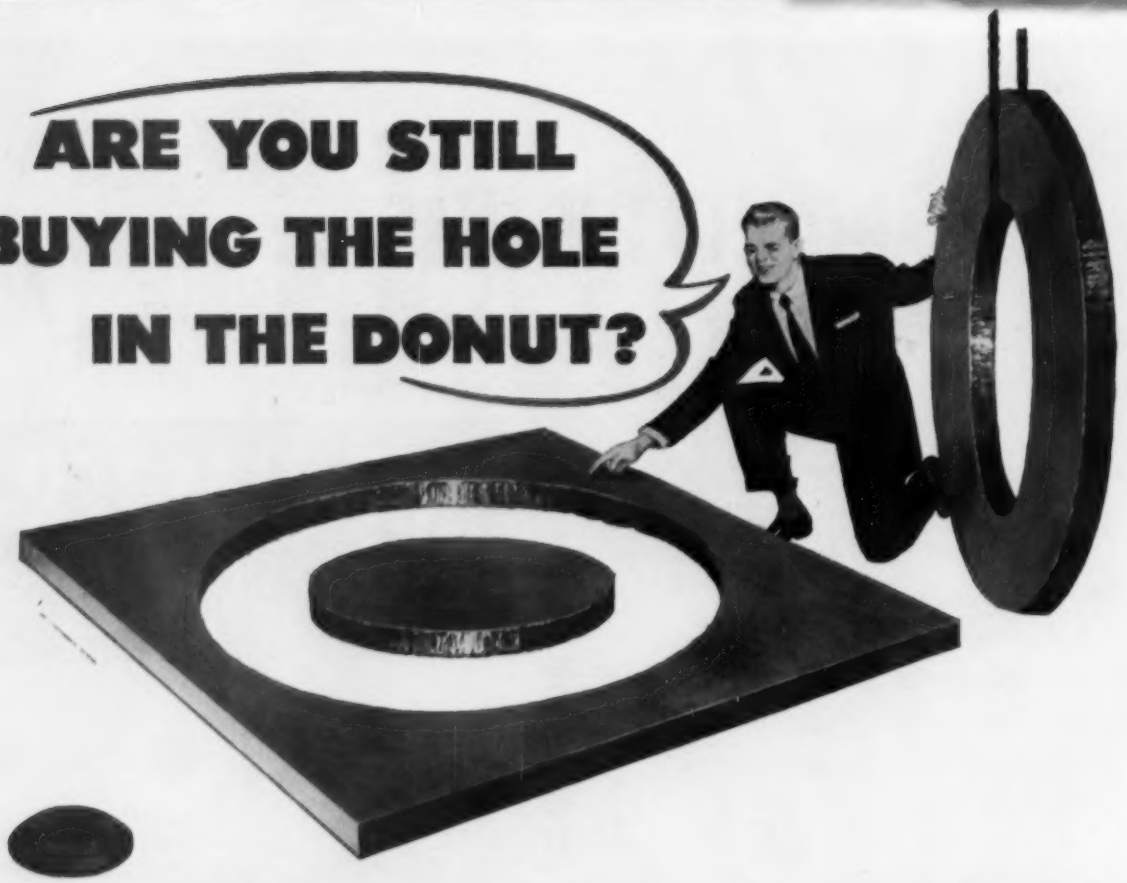


WE INVITE YOUR INQUIRIES—CALL OR WRITE YOUR NEAREST BULLARD SALES OFFICE, DISTRIBUTOR OR

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

ARE YOU STILL BUYING THE HOLE IN THE DONUT?



CLAYMONT FLAME CUT STEEL PLATE SHAPES

Paying for metal you can't use is a lot like buying the hole in a donut—it's just not good business!

That's where Claymont comes in. With Claymont Sheared or Flame Cut Steel Plate Shapes, pre-cut to your exact specifications...

. . . you save:

1. All freight charges on metal you can't use.
2. All handling charges on scrap—because there's no scrap to handle.
3. Storage space—since you don't have to store useless metal.
4. All charges involved in maintaining a plate inventory.

. . . you gain:

1. Better use of your capital investment by reducing needs for materials, patterns and manpower required to cut shapes in your own shop.
2. A constant steel supply from Claymont's widespread producing facilities.
3. The ability to meet all parts production schedules on time.
4. The opportunity to use your investment in shop equipment to better advantage.

A Claymont representative will be happy to give you full details on these and other advantages—without obligation, of course! Just contact our nearest district sales office or write to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

3414

CF&I **Claymont Steel Products**

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Carbon and Alloy Steel Plates • Flanged and Dished Heads • CF&I Lectro-Clad Nickel Plated Steel

ler obviously feels that divisional-line dealerships will unquestionably bolster Plymouth sales.

When the new system is started, it will begin first in large cities and selected metropolitan areas and will be gradually extended to other areas.

Besides enabling salesmen to concentrate their efforts on only one line of cars, Chrysler believes the new system will also have other advantages.

With the large number of body styles, color combinations and accessory options available on today's cars, the new plan will make the problem of maintaining adequate stocks and inventories much simpler. In addition, Chrysler feels that salesroom display space can be used more effectively.

The present system of selling Plymouths through dealers handling another line of Chrysler cars was begun in 1930 when the Plymouth was introduced.

Chrysler-UAW Agree

All of the Big Three were in the supplementary unemployment benefit fold after Chrysler agreed to a Ford-GM type contract with the UAW. Disputes over date of effectiveness and other details snagged negotiations at last minute and a 6-hour walkout hit most plants.

Safety:

Automakers push safety devices in '56 models.

There's going to be a lot of emphasis placed on safety when the automakers come out with their 1956 models later this year.

With Ford and Chrysler already making seat belts available on their cars, General Motors is soon going to get in line. Buick will be the first GM car to feature the belts.

Although GM is not thoroughly convinced of their safety value, the fact that laws have been passed in Illinois and California regarding the belts has not gone unnoticed.

Neither of the laws make seat belts mandatory. Both are watered down attempts at legislating safety. The Illinois law merely requires that cars be built so that an owner can have belts installed if he desires. That's not much of a law when you consider that just about every car on the road today can be adapted for seat belts. The California statute amounts to just about the same thing.

But the laws show that the public is becoming more aware of safety and the auto industry is not going to ignore its customers.

Diesels:

GM looks ahead to fertile power field.

General Motors Corp., famous for years for the unique way in which it merchandised its new cars at the now famous Motoramas, turned its attention last week to a somewhat neglected but nevertheless equally important phase of transportation, diesel power.

Powerama, a show marking

GM's production of 100 million diesel horsepower, is currently being held on Chicago's lakefront and features everything from a newly designed passenger train to a sun powered model automobile.

General Motors unveiled its first 2-cycle diesel engine in Chicago in 1933 at the Century of Progress exhibition. Citing the progress that has been made since then, Harlow H. Curtice, president of GM, notes that it took the corporation 22 years to produce its first 100 million diesel horsepower and predicts that 10 years from now, in 1965, GM will have produced its second 100 million.

Replace Steam

Tracing the history of the diesel engine, Mr. Curtice points out that it has replaced the old fashioned steam engine on today's railroads.

THE BULL OF THE WOODS — **By J. R. Williams**

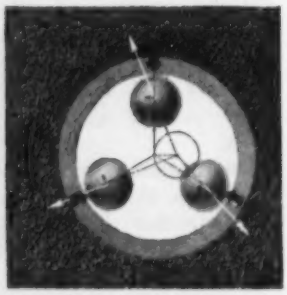
OL' DINNY IS COMIN' DOWN OFF HIS ROOST--HE AIN'T AFRAID OF GITTIN' FIRED BECAUSE SITTIN' DOWN MAKES TH' JOB LOOK TOO SOFT, BUT WHEN A BUNCH OF BOSSES GET SO INTERESTED IN YOUR MACHINE IT MAKES YOU NERVOUS AND CURIOUS!
YEH, IT MAKES YOU THINK THEY'RE PLOTTIN' TO MODERNIZE YOUR MACHINE SO A BIG JOB LIKE THAT WILL COME OUT OF A HOLE IN TH' MACHINE AT THE RATE OF ONE A MINUTE, ALL FINISHED, AND RUN YOU TO DEATH LOADIN' 'EM IN!
THE SUSPICIOUS CHARACTERS
J.R.WILLIAMS 9-7

90 minute exasperating job

now accomplished easily in seconds

In the illustration below, the operator shows how easy it is to balance the grinding wheel on a CINCINNATI FILMATIC 10"R x 72" Plain Hydraulic Grinder.

Automatic balancing control lever and indicator.



Here's how it works. Three steel balls are carried in a raceway in the wheel end of the spindle. As the spindle rotates while the elastically supported bearing assembly is unclamped, the balls are free to move and correct any unbalanced condition that may exist. Then the complete spindle and bearing assembly is locked in position to form a rigid mounting and retain all the advantages of FILMATIC bearings for precision cylindrical grinding.

Have you ever seen an operator balance a grinding wheel mount on conventional static balancing ways? It's a tedious operation, and may require 90 minutes or more to remove wheel mount, balance and replace mount. Cincinnati did something about this. They developed automatic grinding wheel balancing that does the job ten times more accurately and infinitely quicker and easier.

This exclusive Cincinnati feature automatically balances the grinding wheel mount on the machine . . . within a few seconds . . . while the spindle rotates at its operating speed. **This exclusive Cincinnati feature** eliminates vibration and resultant chatter on the work . . . permits more effective stock removal . . . reduces wheel cost per workpiece.

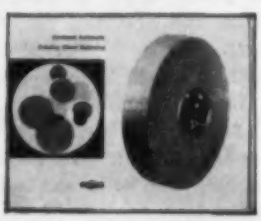
FILMATIC spindle bearings and automatic grinding wheel balancing constitute a team that just can't be beat for lower cost precision cylindrical grinding. Best of all, these features are **standard equipment** on CINCINNATI FILMATIC 6"R, 10"L, 10"R, 14"L, 14" and 16" Plain Grinders, and on 6"R, 10"L, 10"R, 14"L and Semi-Automatic Angular Wheel Slide Grinding Machines. Extra equipment other sizes. Write today for the complete balancing story. Ask for publication No. G-637-1.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Publication G-637-1 explains the Cincinnati Automatic Balancing principle. Write for a copy.



Farm Out Work, Says Defense Dept.

Administration frets over U. S. business for small firms . . . Small share brings pressure for more subcontracting . . . Policy demands greater prime contractor effort to spread work—By G. H. Baker.

◆ IF YOU are a prime defense contractor, you can anticipate new pressure from Washington to farm out more of your government work.

The bureaucrats who add up who gets what in the way of Federal contracts are clucking nervously over the relatively small percentage of defense contracts that goes to smaller firms.

They're doing something about it, too: Army, Navy, and Air Force procurement officers are being pressured to get out of their swivel chairs and make fresh, alert efforts to bring smaller firms into the subcontracting program.

New procurement advice from the Pentagon to prime contractors runs about like this: Don't try to perform the whole contract in your own shop. Subcontract in all possible cases, even though you can easily fill the entire contract yourself.

Urge Company Effort . . . Example of the new forced-draft subcontracting policy being pushed by the Defense Dept.: Air Force prime contractors are being actively urged to set up "small business contracting programs" within their own companies. Each firm is being asked to appoint its own "small business liaison officer" who is supposed to recommend jobs that can be done outside.

"Please forward to me the name of the executive of your company whom you shall appoint Small Business Liaison Officer," contractors are being asked in official Air Force letters.

The Administration doesn't intend to take any unwarranted abuse from Congress over the "small business" issue. It plans to pass the buck to contractors and let them answer for any failure to cut in small firms in the subcontracting picture.

Big Brother Worries . . . There's a growing belief among Administration foreign experts that Russia is getting a little nervous over the way her "protege," Red China, is behaving.

Soviet Communists, clobbered by civilian unrest growing out of shortages of food, clothing, and consumer goods, are ardently pursuing a line of "sweetness and light" in their international relations.

They cannot afford risking a major war at this time. Their economy is barely able to support a rapidly-rising population. Their civilian morale has been shaken by the series of quick changes in Soviet leadership.

Feel Their Oats . . . Red China, meanwhile, grows stronger by the day. Its representatives at Geneva bark "no" to every U. S. proposal involving disarmament, repatriation of troops, and other peace-seeking measures. It's all very embarrassing to the Russian Communists.

Chinese Communist leaders now

RULINGS CURB LABOR, MANAGEMENT

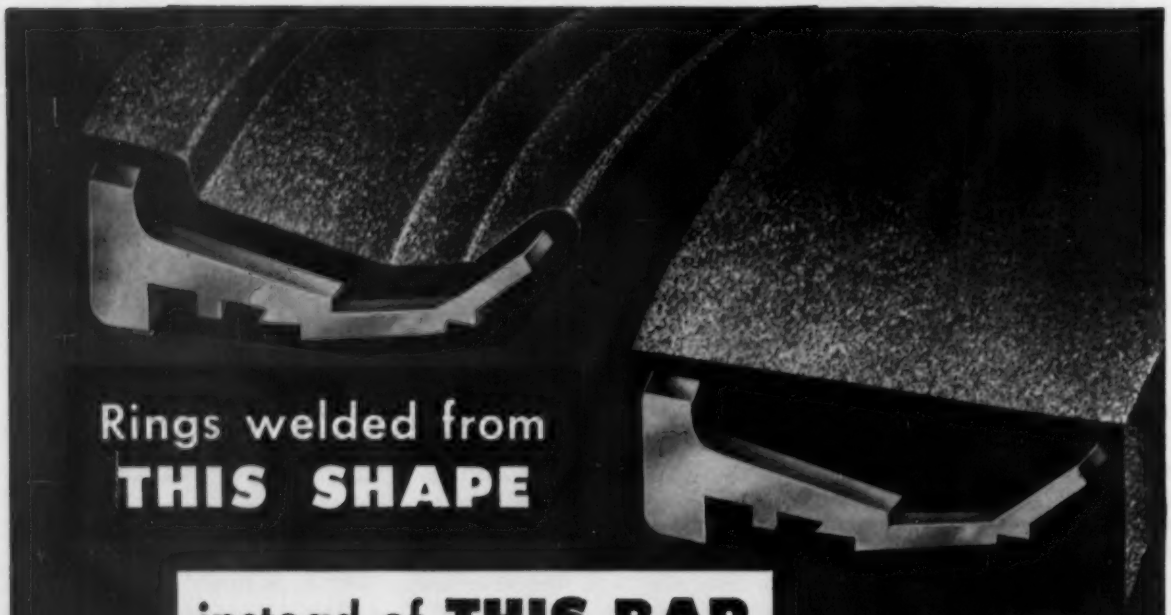
What industry can and can't do in its relations with labor unions is spelled out in a new series of National Labor Relations Board rulings. The specific points outlined by NLRB:

"Improper Demands" Hit —NLRB rules it is improper to refuse to deal with an international. It is not sufficient to recognize only the local union. Also ruled "improper" was an employer request that employees cast secret ballots on proposals to strike or terminate contracts.

Illegal To "Case" Jobs —An employer may properly bar a union representative from making an on-the-job study of an employee's duties.

Industry-Union Panels —An industry and the union it works with should set up and operate their own arrangements for settling jurisdictional disputes. NLRB intends to stay out of such disputes wherever possible.

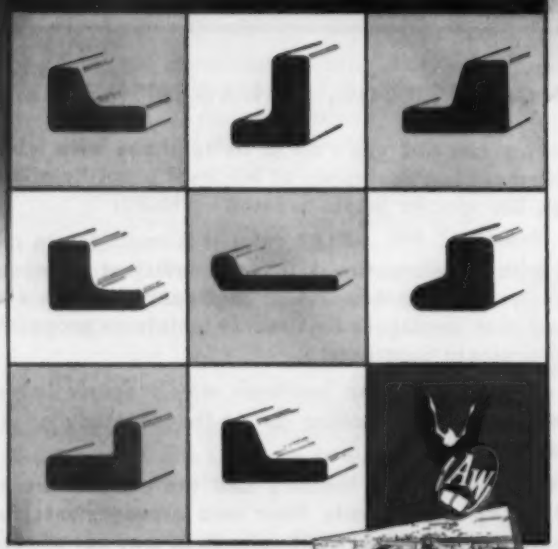
Union Must Arbitrate —An employer may properly fire workers who refuse to arbitrate over the hours and work assigned to any worker.



Rings welded from
THIS SHAPE

instead of THIS BAR

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES
AVAILABLE FROM AMERICAN WELDING



Send for Free Catalog of Production Facilities

Find Out What American Welding Can Do For You

Substitution of a mill-rolled section for a forging previously used, cut the weight of a rough ring 114 lbs. Combined material and machining savings realized in the finished ring amounted to $200.15 per ring —a total of $112,084.00 on a single order.

Economies like this are being effected every day by roll-forming and flash butt-welding of special mill-rolled shapes. Perhaps our Industrial Products Division can help you reduce production costs on similar circular components. Write today for complete information — include blueprints — we will be glad to study your problem.

AMERICAN WELDING

THE AMERICAN WELDING & MFG. CO.
120 DIETZ ROAD • WARREN, OHIO

feel they've come into their own. They'd like to cut ties with the Moscow brand of Communism. They refer privately to the "flabby" Kremlin leaders, and speak of their own regime as the virile "true church" of Marxian revolutionary Communism.

Publicly, however, they are not yet ready to make a break. They desperately need the planes, trucks, tanks, and other implements of war that Russia produces to aid satellites in "educating" the areas of Asia not yet under Red control.

Bloody Days Fade . . . U. S. foreign experts point out that the Russian leaders of today are at least a full generation removed from the revolutionary leaders of 1917. Top Soviet jobs today are held by a middle-class bureaucracy, more intent on preserving the status quo than in shedding their own blood for the holy cause of Communism.

In China, however, today's leadership is in the hands of true revolutionaries. These men look with contempt on the "old women in the Kremlin" and hint darkly that the capital of world Communism belongs not in Moscow but in Peiping.

What this adds up to as far as the U. S. defense program is concerned is that our defense program cannot and will not be allowed to sag. The threat of world dictatorship is just as loathesome, as President Eisenhower sees it, directed from Peiping as it was when directed from Moscow, from Berlin, or from Rome.

Soft Coal Prices Up

Soft coal price hikes of 25¢ and 30¢ a ton have been announced for the three major northern producing areas.

Increases follow the recent wage agreements with United Mine Workers and announcements by southern coal producers of price boosts of 40¢ a ton.

Pittsburgh Consolidation Coal Co. said prices of contract and spot coal in Northern West Virginia and eastern Ohio would be up only 25¢ a ton. Western Pennsylvania coal will go up 30¢ a ton on the average.

New rates will place Pittsburgh Consolidated coal from northern West Virginia mines at $4.15 a ton fob mine. Ohio coals are expected to range from $3.65 to $4.35 a ton. Western Pennsylvania steam coal will run from $4.15 to $4.25 a ton.

Exchange:

Foreign investors find U. S. holdings profitable.

Overseas investment opportunities are looking better to citizens of the U. S. and other countries.

Checking into this confident outlook, the U. S. Commerce Dept. finds one excellent reason for it: American private investors had record earnings of $2.5 billion last year on their holdings abroad. At the same time, foreign long-term investments here reached a new peak of $11 billion.

Returns from U. S. private outlays overseas topped those in 1953 by $145 million. Direct investment accounted for the bulk of the earnings, $2.3 billion. Revenues from oil and mining companies amounted to $960 million and $200 million, respectively.

Income Increases

Manufacturing firms earned nearly $700 million, about half of which was used for further investment. While returns from Canadian manufacturing dropped by $50 million to the $250 million mark, those from European enterprises gained by about the same amount to $240 million.

Income from private (portfolio) investment in foreign securities and credits is growing steadily. Last year it rose to $230 million.

Western Europe's long-term holdings in the U. S. totaled $7.3 billion last Dec. 31. This amount included $3.8 billion in corporate securities and $2.5 billion in controlled enterprises.

Canadian investments amounted to $2.3 billion, about half of which was in Canadian-controlled businesses. Part of the financing of these comes from the U. S.

WASHINGTON NEWS

Okay Export Credits

Latest exporter credits opened to assist the foreign sale of U. S. capital equipment amount to $2.25 million.

Export-Import Bank of Washington sets up four credit lines to help finance overseas sale of oil and water-well rigs, mine safety equipment, textile machinery, and poultry-raising items. Companies, amounts, and products affected are:

Dresser Industries, Inc., Dallas, $1.3 million; heavy machinery for the oil, natural gas, and chemical industries; gas-turbine-driven mobile power plants; and oil and water-well rigs.

Mine Safety Appliances Co., Pittsburgh, $550,000; safety equipment for mining and other industrial operations.

H. W. Butterworth & Sons Co., Bethayres, Pa., $300,000; textile machinery.

The Buckeye Incubator Co., Springfield, O., $100,000; commercial incubators and other poultry-raising equipment.

Ask Zirconium Bids

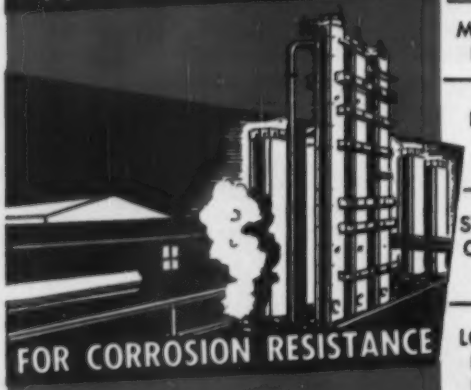
High-purity zirconium and hafnium metal will be bought in greater quantity by the government to fill the growing needs of the atomic energy program.

Atomic Energy Commission, the buying agency, intends to ask for bids on delivery of either 2 million lb of zirconium over a 5-year period or 1.2 million lb over 3 years. Proposals from prospective suppliers also should cover delivery of as much hafnium as can be obtained from the zirconium to be processed.

Invitations to bid will be sent out in November and will call for receipt of bids by next February. Deadline for beginning deliveries is expected to be July, 1957.

Preliminary schedules and other information are available in a "Prospectus for Procurement of Zirconium and Hafnium," which may be obtained from the Pittsburgh Area Office, ASC, P. O. Box 1105, Pittsburgh 30.

CHROMIUM ALLOYS
TO MEET YOUR REQUIREMENTS

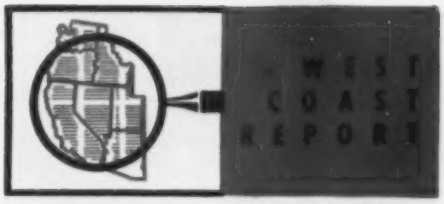


ALLOY	Cr	Si	C	APPLICATION
	PERCENTAGE			
LOW CARBON FERROCHROME	67/71	1.00 max.	.03/2.00	For production of stainless steel, high temperature alloys, and other low carbon alloy steels.
LOW CARBON FERROCHROME-SILICON	37/42	40/45	.05 max.	Used in production of stainless steel to reduce oxidized chrome from slag and also add chromium to the bath.
MEDIUM CARBON FERROCHROME	67/71	2.00 max.	2.25/3.00	Furnace addition for low alloy steels of low to medium carbon content.
FERRO-SILICON CHROME	48/52	25/30	1.25 max.	For simultaneous additions of both Silicon and Chromium to low alloy steels. Readily soluble for either ladle or furnace additions.
STANDARD HIGH CARBON FERRO-CHROME	65/70	2.00 max.	4/6	Standard furnace addition for production of medium and high carbon steel and cast iron.
LOW CHROMIUM HIGH CARBON FERROCHROME	57/64	2.00/4.50	3.50/5.00	Used as charge material in production of stainless steel.
HIGH CARBON FOUNDRY GRADE FERROCHROME	60/66	6/9	4/6	For ladle additions to cast iron. Good solubility.
LOW CARBON FOUNDRY GRADE FERROCHROME	48/52	28/32	1.50 max.	For ladle additions to cast iron to decrease section sensitivity. Excellent solubility.
FERROCHROME BRIQUETS	Cylindrical in shape. Weigh 3½# and contain 2# of chromium. Colored green for easy identification.			Convenient form for adding Chromium to cast iron in the cupola.

DEPENDABILITY · PHILO · QUALITY · SERVICE
DEPENDABILITY · TACOMA · QUALITY · SERVICE
DEPENDABILITY · BRILLIANT · QUALITY · SERVICE

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles



West Shipyards Come Out of Drydock

Navy and commercial jobs bring work to idle yards . . . Guided missile launchers, carrier conversion go to Bremerton . . . Competition between Northwest and California hurts—By *R. R. Kay.*

◆ WEST COAST shipbuilding revival is picking up steam.

Definite Navy job assignments—big ones—follow hard on the heels of promised government-yard work. Private yards here will also benefit.

If your company sells to the shipbuilding and repair industry, count on sending a bigger percentage of products westward. Washington, Oregon, and California yards will have work enough to keep going the next few years.

Don't look for the brightening prospects to make Western industrialists and congressmen quit the fight for ship work. They aim for a still larger chunk of business now going East. However, a threat to their success is growing: Washington-California rivalry for the work. This could break up the effective, solid Western front.

Looking up . . . Puget Sound (Wash.) area is already humming. Dealers in new and used machinery say there's a nice rise in business. Machine shops and metal fabricators serving shipyards are updating equipment.

Here's what's coming to the Puget Sound Naval Shipyard, Bremerton: (1) A $50-million job to build two guided-missile-launching frigates—biggest new-ship construction job there since World War II. The destroyer-size steel-hulled vessels will displace 5000 tons. (2) $10 million for conversion of carriers "Essex," already in dock, and "Hornet," to come later.

California is now getting close to its $200 million goal—the "fair share" of government work sought by Governor Knight's 18-man committee. (See THE IRON AGE, "West Coast Report," Aug. 4, 1955.)

California Work . . . Navy plans for San Francisco Bay Area yards include: construction of a guided missile submarine; conversion of a heavy cruiser and three radar picket vessels. Also, the Navy made official two $50-million projects—construction of a nuclear-powered submarine and guided missile vessel—and a $5-6 million aircraft carrier conversion.

In southern California, Long Beach Naval Shipyard will convert two destroyer-escorts to radar picket ships. Cost: $7 million.

Private yards from Seattle to San Diego, almost dead from lack of work, now see better days ahead. As the Navy gets under way on its combat-ship program, jobs on non-combat vessels—tankers, tugs, and cargo ships—will be farmed out to private yards.

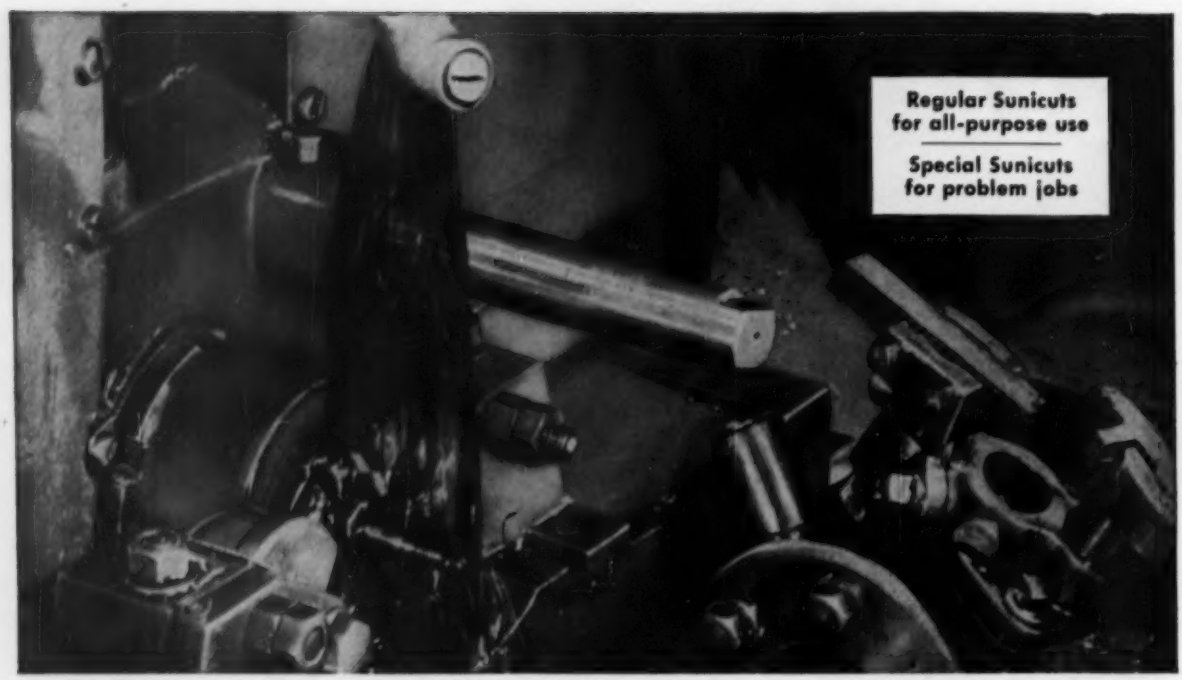
"IT ALL started when he bought that ranch type house."

Ship Stabilizers . . . There's word American Hawaiian Steamship Co. plans $115 million for 10-truck-trailer-carrying ships. Western shipbuilders are sure to make a strong pitch for the business. Route for the 13,000-ton vessels: New York-Los Angeles-San Francisco-Seattle and return.

More good news for Willamette Iron & Steel Co., Portland, Ore. Company's $26.6 million conversion job for Matson Navigation Co., San Francisco, will include installation of new anti-roll devices. The two passenger ships will be first U. S. commercial vessels to get Sperry Gyroscope Company's Gyrofin ship stabilizers. Total cost of equipment is $800,000.

Keep Her Happy . . . Is your company losing too many top-notch secretaries? Bothered by high costs of constantly hiring and training new ones?

Here's money-saving advice from a University of Utah study. You'll keep a competent girl if you (1) give her lots of praise and honest appreciation for her toil, (2) pay her well, (3) don't stick her in grimy office quarters, (4) give her up-to-date office equipment, (5) keep promotion policies consistent, and (6) avoid pettiness about vacations and sick leave when warranted.



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Your Sun representative has the practical know-how to analyze *your* problems. Working with Sun's experienced engineering staff, he's ready to help you pick the Sunicut oil that will give you the tolerances and finishes you want.

The Sunicut series for screw machines is only part of a large selection of non-emulsifying and emulsifying cutting oils available to help you get peak production at the lowest possible cost.

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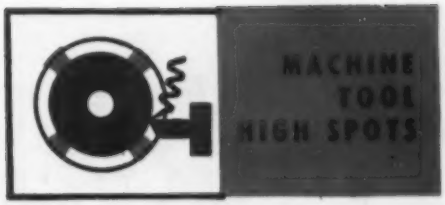

Tool Mobilization Moves Forward

Leasing program numbers 2744 machine tools . . . Most are out on jobs now . . . Elephant tool stockpile only two shy of 310 unit goal . . . ODM plans buying schedule for M-Day—*By E. J. Egan, Jr.*

◆ THE NATION is coming closer to the time when it will be able to absorb an attack and bounce back fighting with plenty of industrial capacity.

Stockpiles of machinery and raw materials are approaching minimum needs; mobilization plans are nearing completion; production deficiencies are being remedied; and emergency supply lines are being drawn, according to the Office of Defense Mobilization.

Deliveries under the industrial machine tool leasing program are complete on all but one of the 2744 tools ordered by the government. These tools are out on lease now, except for 181 which are stored and 83 that were sold.

Survey Big Tools . . . Of 308 elephant tools ordered for stockpiling, only two remain to be delivered. And a survey of giant tools that are privately owned is near completion. It will tell the government how many there are, where they're located and what shape they're in.

ODM is also readying a machine tool "pool order" program that would trigger automatically in an emergency. A standard pool order contract form is being checked by tool-owning government agencies. The mobilization agency is also studying lists of tools bought under the Korean pool order program and will soon have an M-Day purchasing schedule ready.

As an aid to M-Day planning, ODM director Arthur Flemming also expects to use information from a current survey of government-owned tools now leased out for non-defense uses.

Total is less than 1 pct of the 500,000 government-owned machines, and since the leasing rate is 1 pct of the acquisition cost per month, the agency says it is "competitive and adequate" and is not delaying production of new equipment.

Push Dispersal . . . Regarding plant dispersal, government officials are doing all they can to encourage it. ODM says steam turbine and turbine gear makers are among those highly concentrated industries subject to potentially heavy attack damage.

But the only government measures at present to spur voluntary dispersal are rapid tax amortization certificates and direct loans to aid new construction. Dr. Flemming hints he may recommend additional government action this fall.

Control orders to be slapped on industry to direct production, distribution and use of materials and equipment in partial or full mobilization have already been drafted. Tentative plans are also complete to invoke rationing, and to administer direct controls over prices, wages and rents.

Issue Tax Guides . . . Internal Revenue Service, to clarify its position on tax treatment of various machinery leasing and lease-purchase contracts, has issued three new "guides." Requests for these texts or for detailed information should be addressed to the Tax Rulings Div., Internal Revenue Service, Washington 25.

Cincinnati Milling Machine Co. has bought and paid cash for the Heald Machine Co. plant in Worcester, Mass. Heald makes precision boring machines, internal grinders and rotary table surface grinders.

M-DAY PLANS TAKE SHAPE

Government mobilization planners say they're making headway on all fronts. Here's how machine tool situation shapes up:

- **Deliveries of tools for leasing are almost complete. Elephant tools ordered for stockpiling are almost all built, and a survey of privately-owned giant tools is about finished.**
- **A machine tool "pool order" program is almost ready, will trigger itself in an emergency.**
- **Government is still talking voluntary dispersal of industrial plants, may offer new inducements to spur company action.**
- **Orders for controlling industry and production in a non-attack mobilization are ready. A study of similar controls under a real attack situation is underway.**

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THE WORLD'S LARGEST SINGLE CONTACT UNIT

More than a trainload a week—that's the rate sulfuric acid is turned out by Grasselli Chemical Department's new contact unit at East Chicago, Indiana.

Situated to serve the industrial Midwest, it is another step in Du Pont's long-range expansion and modernization program designed to meet the steadily mounting requirements of industry for this basic chemical.

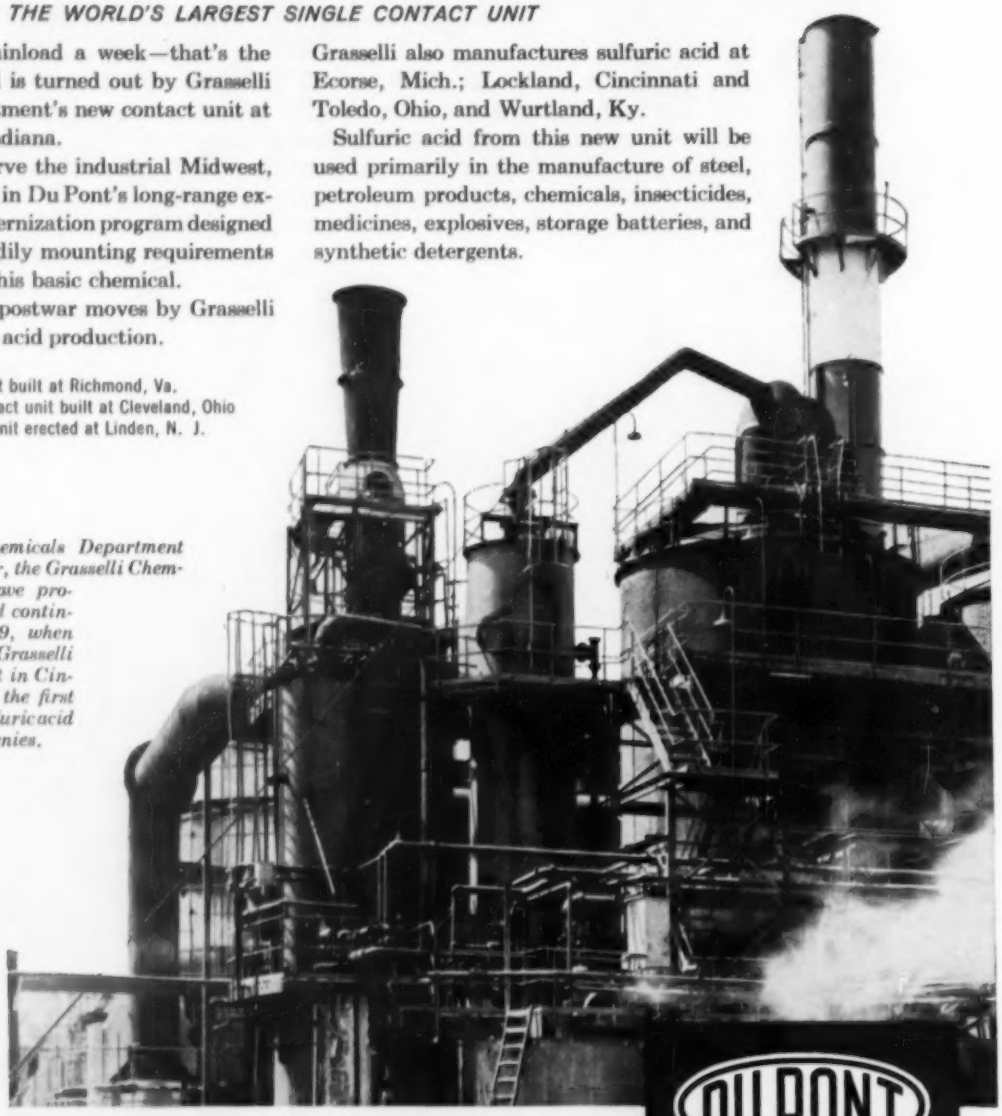
It joins other postwar moves by Grasselli to boost sulfuric acid production.

1947—New plant built at Richmond, Va.
1949—New contact unit built at Cleveland, Ohio
1953—Contact unit erected at Linden, N. J.

Grasselli also manufactures sulfuric acid at Ecorse, Mich.; Lockland, Cincinnati and Toledo, Ohio, and Wurtland, Ky.

Sulfuric acid from this new unit will be used primarily in the manufacture of steel, petroleum products, chemicals, insecticides, medicines, explosives, storage batteries, and synthetic detergents.

The Grasselli Chemicals Department and its predecessor, the Grasselli Chemical Company, have produced sulfuric acid continuously since 1839, when Eugene Ramiro Grasselli established a plant in Cincinnati, becoming the first man to produce sulfuric acid west of the Alleghenies.



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New York 1, N. Y. ..... 350 Fifth Avenue
Philadelphia 3, Pa. ..... 1617 Penna. Blvd., Room 860
Pittsburgh 19, Pa. ..... 1715 Grant Bldg.
St. Louis 7, Mo. ..... 112 West Ferry Street
San Francisco 19, Calif. ..... 1400 Sixteenth Street

In Canada—Du Pont Company of Canada Limited, Box 660, Montreal, P. Q.

The Iron Age

SALUTES

Edward P. Schinman **In 1940 he saw that automatic controls were the coming thing and set out to make them. His vision paid off in company success, added to the country's strength and efficiency.**

In 1940, Edward Schinman raised $1500 and bought Bogue Electric Manufacturing Co., Paterson, N. J. Mr. Schinman was then 30 years old. He was an engineer specializing in water treatment, had done some high school teaching.

The life expectancy of companies costing $1500 is not high even with old hands at the helm. Mr. Schinman was only a few years away from school but if he was light on past experience, he proved to have a good eye for the future. Calling the turn on automatic control as the coming industrial and military thing, he pushed development in this direction. The company moved into electronic, electric power, thermo dynamic, servo system and related work. The firm became a leader in the water treatment field. Bogue equipment found its way into atomic submarines, guided missiles and production control systems.

Last year, company sales hit the $25 million mark. The central plant has been expanded and modernized. A new building is under construction at Ottawa, Canada. Bogue engineering staff numbers nearly 250 men. Mr. Schinman guessed right on the future and he had the inventive competence to come up with answers to new needs. He holds a number of patents, is personally responsible for a water purification device that has become standard life raft equipment. He tackles tough problems, makes money licking them.

Mr. Schinman became interested in science as a boy, won a scholarship to Rensselaer Polytechnic Institute. Majoring in engineering, he graduated in 1930 and went on to graduate studies at Columbia. He began his business career as an engineer in New York, winning wide renown as an authority on water treatment.

A quiet man who plays the piano and tournament bridge, he has a hole-in-one to his credit, maintains a wide range of general interests. In 1947, he was invited by Finland to serve as an economic consultant and traveled 20,000 miles through Holland, Switzerland, Belgium and other countries. His daughter, Ellen Jane, started taking flying lessons at the age of 15. Mrs. Schinman is a licensed pilot.

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The Iron Age INTRODUCES

L. J. Westhaver, appointed vice-president-operations for Columbia-Geneva Steel Div., **United States Steel Corp.,** San Francisco.

G. A. Price, elected chairman and president of **Westinghouse Electric Corp.,** Pittsburgh.

M. W. Cresap, Jr., elected as executive vice-president and deputy chief executive officer, **Westinghouse Electric Corp.,** Pittsburgh.

L. E. Osborne, elected vice-chairman of the board; **J. K. Hodnette,** elected vice-president-general manager; **A. C. Monteith,** elected vice-president in charge of apparatus products division; **J. A. Hutcheson** named vice-president in charge of engineering and research, **Westinghouse Electric Corp.,** Pittsburgh.

Joseph O'Brien, elected president, **The Bristol Brass Corp.,** Bristol, Conn.

C. F. McKenna, Jr., elected treasurer of Johnson & Hoffman Co., Mineola, L. I., N. Y., associate of **Superior Tube Co.**

H. F. Biggar, Jr., appointed manager of new product development, **Reliance Electric & Engineering Co.,** Cleveland, Ohio.

F. H. Stieler, appointed sales engineer — extrusion products, **Jones & Laughlin Steel Corp.,** Pittsburgh.

J. D. McCall, promoted to general manager of operations, Columbia-Geneva Steel Div., **United States Steel Corp.,** San Francisco.

A. C. Sanderson, named traffic manager for Middletown, Ohio, plant of **Armco Steel Corp.**

J. A. Cairns, appointed sales manager, **Allied Research Sales Corp.,** Baltimore, Md.

C. S. Wiedman, appointed manager of carbide products development engineering, Carboloy Dept., **General Electric Co.,** Detroit.

J. H. Barry, appointed sales representative for Pittsburgh-Buffalo area, Socket Screw Div., **The Bristol Co.,** Waterbury, Conn.

J. E. Burch, Jr., named west coast gage sales engineer for Pratt & Whitney Div., **Niles-Bement-Pond Co.,** West Hartford, Conn.

L. H. Decker, appointed assistant works manager of foundries and pattern shops, **Allis-Chalmers Mfg. Co.,** Milwaukee, Wis.

H. R. Dueber, appointed superintendent of the transportation department, **Republic Steel Corp.,** Warren, Ohio.

C. F. Ivins, Jr., appointed assistant manager of electrical sales, **Hanson-Van Winkle-Munning Co.,** Matawan, N. J.

J. M. FINNALLY, elected vice-president in charge of manufacturing, Detroit Broach Co., Rochester, Mich.

E. H. H. GRAF, elected vice-president in charge of sales, Detroit Broach Co., Rochester, Mich.

E. C. BREKELBAUM, elected vice-president of The Thew Shovel Co., Lorain, Ohio.

M. B. GARBER, elected vice-president of The Thew Shovel Co., Lorain, Ohio.

NOW-Make Your Own Oxygen and Nitrogen in One Generator

With INDEPENDENT'S newly-designed generators, you can make your own high-purity oxygen and nitrogen from the free air . . . and in the same generator.

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C. A. Fee, elected vice-president and secretary, **ACF Industries, Inc.,** New York, N. Y.

D. T. Marvel, appointed vice-president in charge of sales, Metals Div., **Olin Mathieson Chemical Corp.,** New York, N. Y.

N. R. Kidder, appointed vice-president and director of marketing operations, **Technical Marketing Associates, Inc.,** Concord, Mass.

J. W. Morgan, promoted to sales manager, Eastern Tractor Equipment Div., **Hyster Co.,** Peoria, Ill.

J. C. Lee, appointed chief engineer of the Industrial Div., **The Wayne Pump Co.,** Fort Wayne, Ind.

M. R. Petersen, appointed sales engineer, Ohio territory, **The George Sall Metals Co., Inc.,** Philadelphia.

Joseph White has joined the **Green River Steel Corp.,** Owensboro., Ky., as general manager of sales.

R. U. Haslanger, appointed director of industrial sales, **Stauffer Chemical Co.,** New York, N. Y.

R. G. Wells, named sales manager, **Minnesota Rubber & Gasket Co.,** Minneapolis, Minn.

C. C. Hess, appointed production manager, **Pressed Steel Tank Co.,** Milwaukee, Wis.

T. R. Darmody, named assistant general manager, Vitro Engineering Div., **Vitro Corp. of America,** New York, N. Y.

J. G. Wikoff named manager of a new sales service department of **Armco Steel Corp.,** Middletown, Ohio. **J. E. Lyons** named general supervisor of the department.

W. S. Milton appointed sales manager of Hudson Motors Div., **American Motors Corp.,** Detroit.

A. E. VAN CLEVE, has joined Barium Steel Corp. New York, N. Y. as vice-president.

CARL CLAUS, named director of staff, The Babcock & Wilcox Co., New York, N. Y.

W. J. FENWICK, appointed controller of Lamson Corp., Syracuse, N. Y.

A. H. RINGHOLM, appointed manager of railroad sales for Kaiser Aluminum & Chemical Sales, Inc., Chicago.

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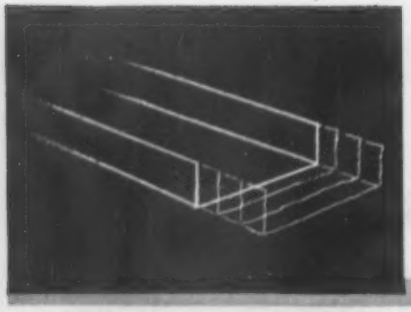

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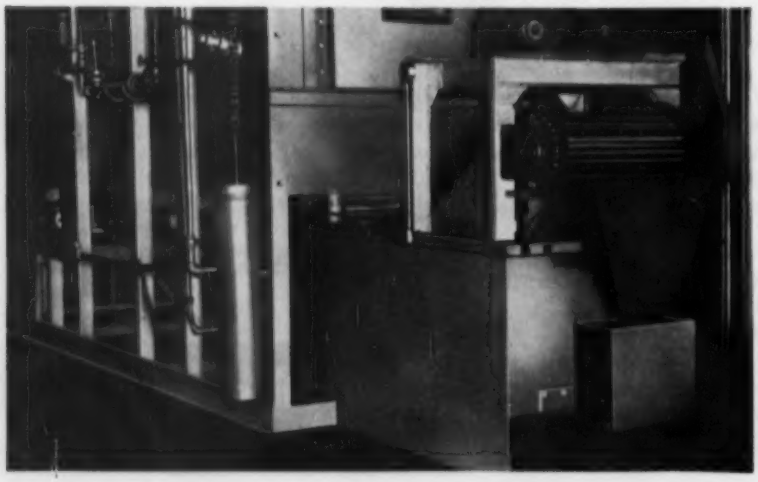

PERSONNEL

S. L. Furman, appointed assistant treasurer of **The National Supply Co.,** Tulsa, Okla.

J. F. Thurston, appointed general manager of Electro Dynamic Div., **General Dynamics Corp.,** Bayonne, N. J. **M. E. Hall** becomes works manager.

H. B. Smith, appointed director of product engineering at Claymont, Del., plant of **Colorado Fuel & Iron Corp.,** New York, N. Y.

E. R. Kohl, promoted to purchasing agent, Parish Pressed Steel Div., **Dana Corp.,** Reading, Pa.

P. C. Rossin, appointed research associate for **Universal-Cyclops Steel Corp.,** Bridgeville, Pa.

J. A. Mark joined the advertising staff of **The Carborundum Co.,** Niagara Falls, N. Y.

Richard Johnson, appointed manager and **T. E. Davis** appointed salesman for Syracuse sales office, **International Resistance Co.,** Philadelphia.

A. B. Morse, named vice-president and western sales manager of **Mexico Refractories Co.,** Mexico, Mo.

A. K. Heydrick, named director of education and training, **National Steel Corp.,** Pittsburgh.

OBITUARIES

W. U. Cigliano, 56, vice-president and director, **Russell, Birdsall & Ward Bolt & Nut Co.,** Port Chester, N. Y.

A. J. Yonker, 67, retired traffic representative, **Republic Steel Corp.,** Chicago.

G. H. Kellogg, 71, retired vice-president, **American Can Co.'s** Central Div., Chicago.

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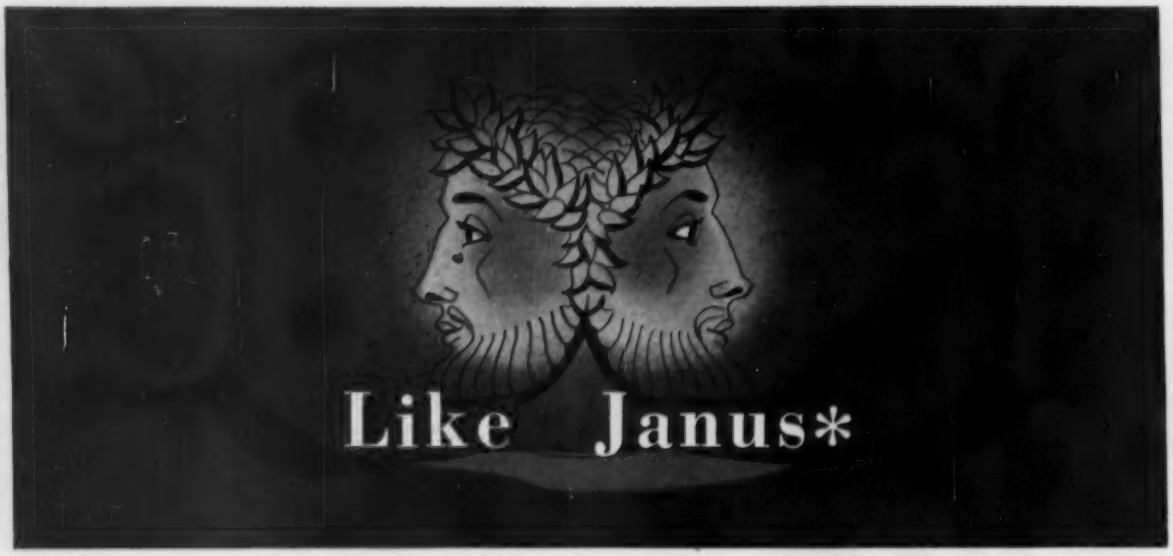

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Reviewing the past, The J. E. Baker Company is proud of the part it has played in the astounding growth of the steel industry. Since 1889 the JEBCO name has stood for superior products. One of these products, BAKER'S MAGDOLITE the *original* dead-burned dolomite, was the result of continuous research and experimentation to find a far better basic lining for open hearth and electric furnaces. Today as in the past, BAKER'S MAGDOLITE offers increased furnace efficiency at lower refractory costs.

In the future, users of BAKER'S MAGDOLITE can be assured of constantly improved quality and effectiveness, in keeping with the tremendous strides foreseen in increased steel production.

If you haven't done so in the past, be sure to try BAKER'S MAGDOLITE in the near future. You'll discover as others have through the years that the properly burned, grain-sized particles of BAKER'S MAGDOLITE mean more uniform ingots, in greater numbers and with less defective material. Next time specify BAKER'S MAGDOLITE.

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*Janus, the two-faced mythological Roman God of Doors and Gates, could see both what passed behind and before him at the same time.

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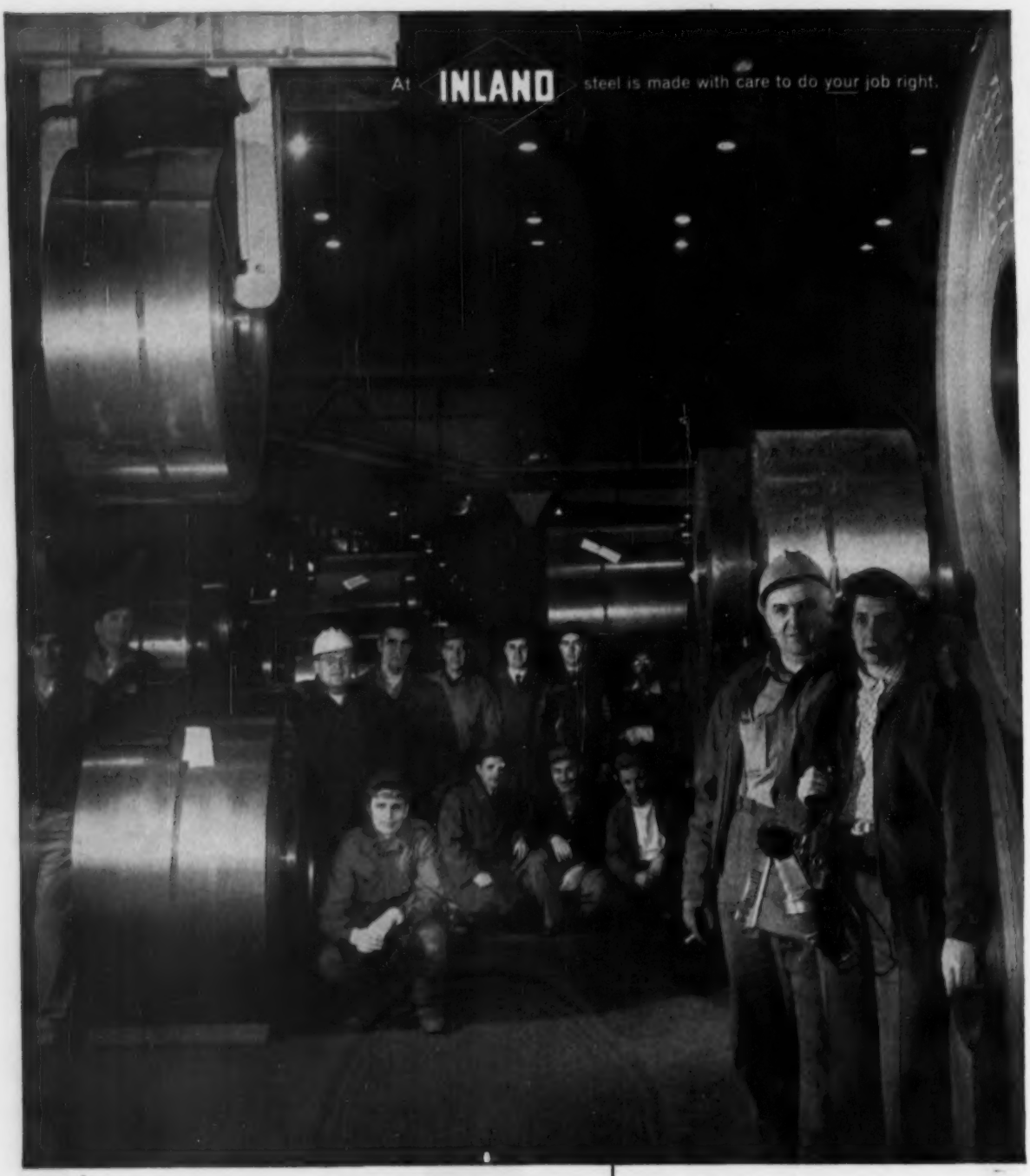

THESE INLAND PEOPLE CAN TELL US "NO" (AND FREQUENTLY DO)

The power of veto is delegated to many people at Inland, any one of whom can turn thumbs down on our steel, somewhere along the line, if it isn't right for your job. Take cold rolled sheets, for example. Inland encourages this negative attitude on the part of the individuals in this photo, who are concerned with quality control at various stages of steel production. Their vigilance assures you of uniformly good quality steel, order after order, year after year.

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The Iron Age
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TECHNICAL ARTICLES

Through proper control—

How To Get Good Results in Forging High-Temperature Alloys

By A. A. SCAFATI, Chief Metallurgist, McWilliams Forge Co., Rockaway, N. J.

◆ Good forging results can be attained with the high-temperature alloys by using correct temperature control and proper reduction rates and methods . . . Among the newer alloys forged successfully are the Hastelloy alloys X and W and Haynes alloy No. 25.

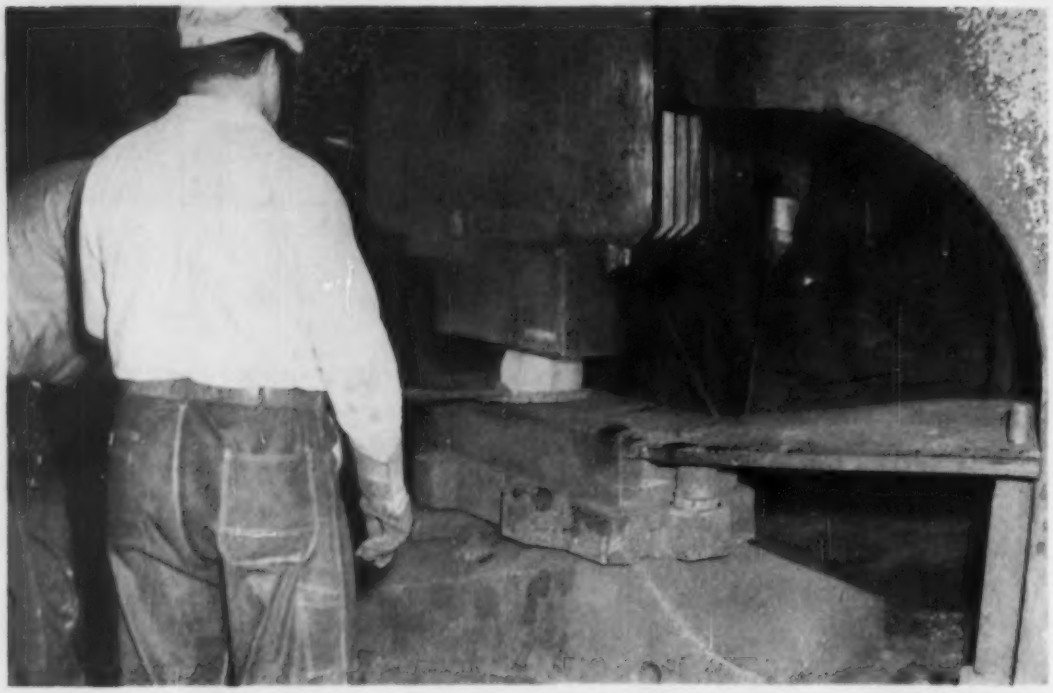
◆ High-alloy forgings may solve many problems for design engineers working on high-temperature equipment . . . The methods used show promise that such forgings can be made on a production basis.

◆ DESIGNERS in the aircraft, power, and chemical industries are constantly searching for materials to be used under higher stresses and at higher temperatures. To meet these demands, McWilliams Forge Co. has carried out a continual development program of forging new alloys. The most recent work has been done on some nickel- and cobalt-base alloys containing various amounts of alloying elements such as molybdenum, chromium, iron and tungsten. The findings show that good results can be obtained so long as correct temperature control and the proper rate and method of reduction are employed.

Among the new alloys forged have been Hastelloy alloy X, Hastelloy alloy W and Haynes alloy No. 25. The first alloy contains about 45 pct Ni, 20 pct Fe, 22 pct Cr and 9 pct Mo. Alloy W contains 58 pct Ni, 26 pct Mo and 6 pct each of Cr and Fe. Alloy No. 25 contains about 40 pct Co, 20 pct Cr, 15 pct W, 10 pct Ni and small amounts of iron, silicon and manganese.

All three alloys, produced by Haynes Stellite Co., are used extensively in the aircraft field for jet engine components. Of the three, alloy X is the easiest to forge. It is used in a great many non-military applications because of its low strategic alloy content and low cost.

At first glance, the high-temperature properties of these alloys would discourage a forging manufacturer. Hastelloy alloy X and Haynes alloy No. 25 have been used in the cast and hot-rolled form because their high strength at temperatures up to 2300°F. For example, at 1800°F alloy X has an ultimate tensile strength of 21,000 psi. The ultimate tensile strength of alloy 25 is somewhat higher at this temperature. Alloy W has previously been used mostly as welding wire for joining high-temperature aircraft components. Good forgings have been produced



FIRST UPSET starts to work a 6-in. square billet into a ring. After this, upset is edged lightly and put back in furnace for reheating.

from all three alloys heated to a temperature of about 2100° to 2200°F.

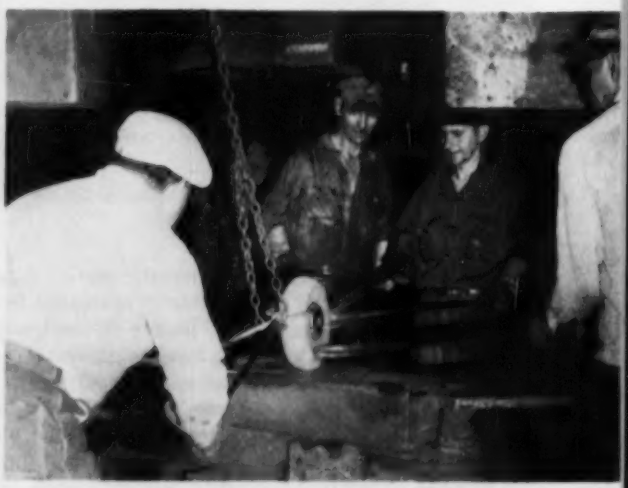
One of the first forging programs with alloy X was the manufacture of small turbine blades from hot-rolled strip. This is the only closed die work done to date on alloy X. Because the metal tends to lose heat to the die in closed die work, and because the forging temperature range is rather narrow, the dies were preheated.

Before the forging operation, the alloy X strip was heated to 2100°F. A number of blades were forged on a 2500-lb steam hammer. It took about 10 operations to produce the finished blades. Each operation consisted of a pass through a rough, a finish and a flash trimmer die. The blades were brought back to temperature after each operation.

Forge turbine rings

In addition to the turbine blades, alloy X has also been forged into turbine rings from 6 in. sq billets. Before forging, the billets were held in a furnace at a temperature of 2180°F for 5 hours. They were then upset on an 8000-lb steam hammer down to a thickness of about 4 in. A punch was then driven through the center of the billet after which the crude ring was placed over a mandrel and forged to the final dimensions on a 2000-lb steam hammer. After forging, these rings had an outside diameter of about 20 in. and a 1½ in. thickness.

Because of the good results obtained in forging alloy X, it was decided to forge similar rings from alloy No. 25. These rings were forged from a 6-in. diam billet which had been reduced from a 12 in. sq ingot. An 8000-lb steam hammer was used for upsetting, punching, straightening and sizing the rings. A 3300-lb steam hammer was



BILLET is flattened to 4-in. thickness, then center punched while in the 8000-lb steam hammer. Forging on a 2000-lb hammer follows.

used for swaging to expand the ring. Heating of the billet was done in an oil-fired furnace equipped with instruments capable of maintaining the temperature to within ±10°F.

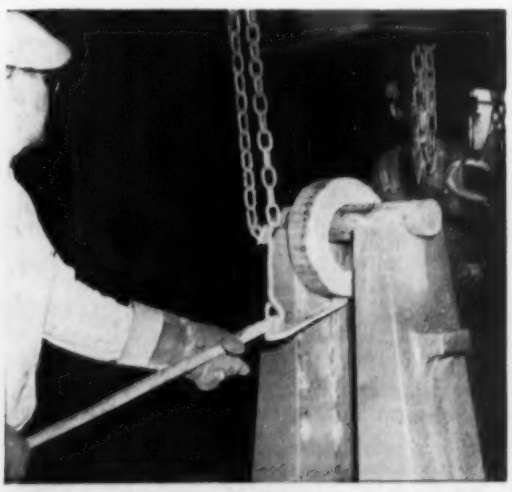
After soaking the billets for an hour at 2100°F, the furnace temperature was raised to 2225°F for an additional 45 minutes. Two 36-in. diam rings were forged first. One of these was left in the furnace while the other was being worked. Each was forged in 24 separate operations. After forging, the rings were stress relieved by heating back to forging temperature and then air cooled.

Proper soaking important

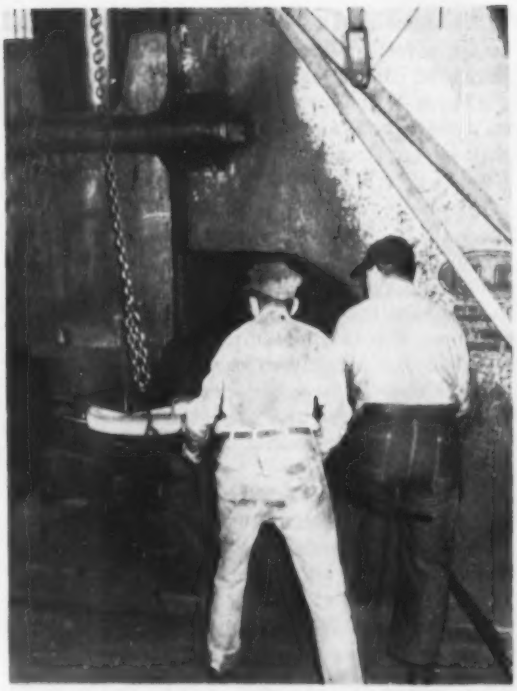
The same general procedure was used for making 23-in. diam rings. These were made in 14 different operations which took about 5¼ hours. No difficulty was encountered during forging. A few slivers developed in the punching operation but these were readily removed with a hammer and gouge.

The most recent job has been in forging 10 more turbine rings from Hastelloy alloy W. These rings were forged to a finished shape of 34⅜ in. OD and 2⅝ in. thick, using the same general procedures as for alloy X and alloy No. 25. While alloy W was the most difficult alloy of the series to forge, the job was a success.

Some general observations were made in forging these high-temperature alloys: First, it is highly important that billets are properly soaked before forging. Billets can be charged into the furnace at room temperature, then gradually brought up to forging temperature; or they may be charged into a furnace already at forging temperature. They should soak until they reach a uniform temperature throughout. As a general rule, they should be soaked one hour at forging temperature for each inch of thickness.



LARGER MANDRELS are slipped through the hole as it is enlarged. Reasonably heavy blows can now be applied by the 2000-lb steam hammer.



NEARLY COMPLETED, this ring is being flattened a little more to a 1½-in. thickness. After forging, the ring is stress relieved.

Use of a well-calibrated optical pyrometer is essential. This should be sighted on the piece to be forged when the flame is in the low-fire or off stage. A further check may be made by visually observing the hearth underneath the piece and determining whether its temperature and that of the billet are about equal.

Good practice calls for turning the stock frequently to present the cold side to the furnace atmosphere. Once the billet reaches uniform forging temperature, nothing is gained by further soaking. Direct flame impingement on the alloy must be avoided. It is also highly important that fuel of low sulphur content be used.

Forging should begin immediately after withdrawal from the furnace. Even a very short time lapse may allow surface temperature to drop as much as 100° to 200° F. This will shorten the time available for forging. It is also unsafe, from a forging viewpoint, to raise soaking temperatures to compensate for loss of heat during the transfer. Overheating can cause fusion at the grain boundaries of the alloy and cause weakening of the metal structure.

A much better practice is to reheat the alloy each time the temperature drops to a point where further reduction might tend to fracture the metal. The reheating temperature differs in different operations and can be determined only through experience.

The number of reheatings in any job depends on the severity and rapidity of hot working, the length of time in contact with the forging dies, the shape of the piece being worked, the amount of deformation, and the number of delays that may be encountered during the forging operation.

There are no unusual difficulties in forging these alloys. However, starting with square cast ingots, care must be exercised in the initial reduction. Freezing of the metal after pouring in a square ingot develops a diagonal point of weakness. Ingots will tend to rupture along these planes if subjected to extreme pressure. Light, rapid blows are recommended until the cast structure is broken up. After the cast structure is broken up, reasonably heavy blows can be used.

No attempt should be made to change the general shape of a billet during the initial stages of forging, particularly when starting with a cast ingot. The alloy should be worked down in the form of a square with equal reduction in both directions. When a square is reached with dimensions across the flats only slightly greater than those of the desired round, the rounding operation may be started.

Break corners gradually

Rounding can be done by gradually breaking the corners with light blows. This should be continued until the cross-section assumes an octagonal shape in which the four original sides are twice the length of the sides formed by breaking the corners. At this point, it is advisable to change to a bottom die with a 90° V and retain the flat top die.

By placing the billet in the V with the small sides contacting the arms of the V, the hammer or press will tend to push the metal towards the center at three points. This compresses the open center structure and minimizes the possibility of center bursts. This may be continued until the billet is worked into a perfect octagon whose dimensions across the flats are equal to the diameter of the finished round. Corners of the octagon are then hammered or pressed down and the billet rounded and sized. To avoid working the metal too severely, it is expedient to use "pegs" or pieces of metal of known gage size to meter the hammer strokes.

Remove cracks and tears

The removal of cracks and tears developed in forging the billet is also important since they tend to propagate as forging proceeds. If these occur on the corners, they can often be removed by gouging while still under the hammer. Otherwise, it may be necessary to cool the billet and grind out the defects.

No severe up setting has been done on these alloys, but it is believed that it can be done successfully. Upsetting of the high-temperature alloys can be carried out if the length of the piece to be upset is no greater than twice the diameter. Pieces have been upset to one-sixth of their original length in three stages with intermediate reheating and proper surface conditioning.

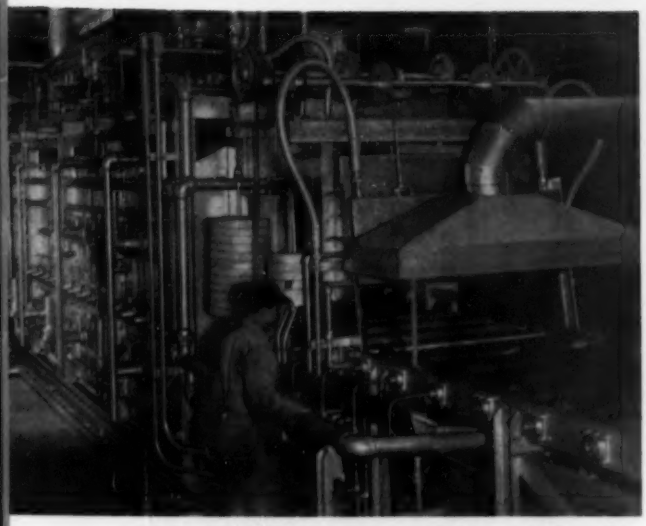
Surface cracks are ground out of the periphery after each stage. These same principles apply in gathering where a bar is upset to increase the diameter and form a head.

High-alloy forgings seem to answer many problems for the design engineer working with high temperatures. While there is still a great deal to be done, there is promise that such forgings can be made on a production basis.

Forging Temperatures for Some High Alloys

Alloy	Composition, pct								Forging Temp., °F	
	Co	Ni	Fe	Cr	Mo	W	C	Others	Start*	Stop†
Multimet	18.5–21.0	19.0–21.0	Bal.	20.0–22.5	2.5–3.5	2.0–3.0	0.08–0.16	0.75–1.25 Cb + Ta, 0.10–0.20 N	2200	1800
Hastelloy X	0.50–2.50	Bal.	17.0–20.0	20.5–23.0	8.0–10.0	0.20–1.00	0.05–0.15*	.....	2200	1800
Hastelloy F	2.50*	44–47	Bal.	21.0–23.0	5.5–7.5	.....	0.08*	1.75–2.5 Cb + Ta, 0.15 Cu*	2150	1750
Hastelloy B	.....	Bal.	4–7	1*	26–30	.....	0.12*	1 Si*, 1 Mn*	2200	1800
Haynes #25	Bal.	9–11	3*	19–21	.....	14–16	0.05–0.15	1 Si*, 1–2 Mn	2250	1850
Hastelloy C	.....	Bal.	4.5–7	15.5–17.5	16–18	3.75–4.75	0.15*	1 Si*, 1 Mn*	2250	1850
Hastelloy W	.....	Bal.	4–7	4–6	23–26	.....	0.12*	1 Si*, 1 Mn*	2200	1800

* Maximum. † Depending on nature and degree of work.



CONTINUOUS furnace used for typical carbon restoration applications is aimed at volume.

Pros and Cons of Carbon Restoration

◆ Carbon restoration is getting universal attention because it can mean extra dollars . . . It can reduce machining, salvage scrap and improve a borderline product.

◆ Its success depends mainly upon control and equipment . . . However, the type steel restored may affect the end result . . . This raises the all-important question: "Does carbon restoration have its limitations?"

By P. M. UNTERWEISER, Metallurgical Editor

◆ THE ECONOMIC justification of carbon restoration is double-edged. It can sometimes salvage decarburized scrap. Under certain conditions, its application may result in cost reduction and quality improvement.

Dozens of successful applications of carbon restoration have been reported in recent years. Despite this very worthwhile coverage, it is important to recognize that the process does have its limitations.

Mechanical test data applying to carbon restored materials is extremely scanty. Photomicrographs showing neatly restored structures are not always a substitute for mechanical data. Nor can they provide comparisons with unrestored materials in on-the-job performance. With little of this information at hand, an evaluation of the pros and cons of carbon restoration should precede its actual application.

A decarburized surface is a weak point that may, and frequently does, lead to part failure. In terms of hardness, the decarburized area is softer than the core material. It does not have the same ability to resist wear. Also, its strength may be significantly less than that of the parent material. Carbon restoration is intended to overcome both of these disadvantages.

Most heat treaters and fabricators take every precaution to avoid decarburization or, at least, hold it to an absolute minimum. In practice, there are times when eliminating possible "decarb" just isn't feasible. There are also times when with present equipment it's downright impossible.

Large batch-type furnaces such as those used in rod mills are a case in point. Such furnaces, if only because of their size, can present a difficult problem in terms of tightness and temperature uniformity. Maintaining a uniform dew point and a constant carbon potential in some of these furnaces is often impossible.

Steels heat treated in these furnaces may be subject to some surface decarburization. If the material heat treated happens to be bar, turning

or centerless grinding are expensive means for mechanically removing the decarburized layer. Restoring carbon to these areas makes good sense, economically.

Certain other operations, such as the hot upsetting of bolt heads can not, by their very nature, completely avoid some surface decarburization. Even when the bar stock used in the operation is free of "decarb" prior to hot upsetting, the hot end after forming will usually show some signs of carbon loss.

Decarburization of bolt heads can be a serious problem since the heads are specifically designed for maximum load carrying capacity. Carbon drop-off in these critical areas can result in failure in fatigue.

Many large forgings are prone to surface decarburization because they have to be hot-formed and require a considerable number of "strikes" to complete. Sometimes it is necessary to reheat between strikes.

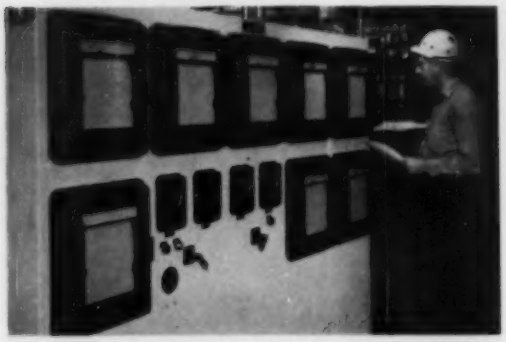
The standard answer to this problem has been to allow sufficient stock for subsequent removal of all decarburized areas. The machining required to do this greatly increases the cost of the finished part. Also, material realization is lowered, since a healthy percentage of steel is lost in turnings.

Waste less metal

Steel castings, whether sand or investment cast, are also subject to surface decarburization. Since pouring temperatures are necessarily high, carbon loss at the surface can be severe. A decarburized layer 0.025-0.035 in. deep, is not uncommon for large sand castings. Machining these surfaces may be even a tougher problem, since many parts are cast simply because their geometry is highly intricate.

These are a few of the many examples cited to prove the usefulness and broad applicability of carbon restoration. The advantages have a high degree of appeal. Essentially, they add up to less scrap, less machining, less wasted metal.

There are a variety of methods and equipment for carbon restoring. One of the most successful



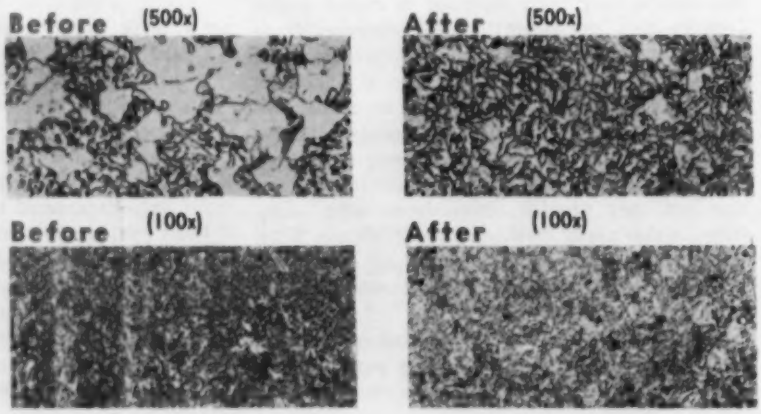
CONTROL is all-important. Temperature uniformity, dew point, and furnace tightness are factors.

involves the use of a radiant tube, carbottom-type furnace and controlled carbon-rich atmospheres. This system makes use of both protective, NX exothermic, and reactive RX endothermic, controlled atmospheres.

The NX generator produces a gas mixture composed of less than 0.1 pct CO_2, less than 2.0 pct CO, less than 2.0 pct H_2 and 96 pct N_2. The RX generator produces a reactive mixture containing 0.4 pct CH_4, 20.0 pct CO, 40.0 pct H_2, and 39.6 pct N_2. With the reactive mixture, the carbon restoring potential of the atmosphere is controlled by adjusting the dew point. A blending of both NX and RX gases, it is claimed, has proved helpful.

This method makes use of equipment manufactured by the Surface Combustion Corporation. It is reported to produce excellent results in restoring carbon to plain carbon steels. Materials handled ranged from SAE 1008 to 1095, indicating that a variety of carbon levels can be successfully applied.

Photomicrographs showing both the carbon restored and core materials indicate that a high degree of homogeneity has been achieved in the restored areas. The carbon content, at least upon visual examination, appears to be about the same in core and restored material. This degree of



VANADIUM-CONTAINING alloy steel before and after carbon restoration. Large ferrite plates (upper left) indicate extent of decarburization. Photomicrograph at lower right indicates carbon pickup exceeds core carbon content slightly.

For conservation—

success is not uncommon in the restoration of plain carbon steels.

Other methods of carbon restoring have also been used with reasonable success. Some of these methods employ liquid carburizing media. Such liquids, when they are vaporized at elevated temperatures, provide the carbon-rich atmospheres required for restoration.

One such liquid is currently used on a commercially large scale. It is the well-known Homocarb fluid, used in connection with the Leeds and Northrup Microcarb controller. The same equipment is also used for controlled case carburizing. When the equipment is applied to carbon restoration, the carbon potential is usually set at a much lower value. This is intended ultimately to approximate the carbon content of the steel to be surface restored.

Some of the limitations of carbon restoration are not generally understood. Unfortunately, a lack of knowledge of the process' limitations has sometimes resulted in purchasing the wrong equipment for the job.

Prevent carbon pickups

One definite limitation is the type of furnace that can be used. Pit-type furnaces and other types which do not provide for direct quenching or reasonably rapid cooling under atmosphere from elevated temperatures, are not generally recommended for carbon restoration. They have been used, but not without considerable difficulty.

The importance of direct quenching at the end of the restoration cycle stems from factors inherent in the process. An atmosphere that is neutral to a particular steel is difficult to maintain over a range of temperatures.

For example, if a 1040 steel is being restored, a 0.40 pct carbon potential should be neutral to the steel at a given temperature. An increase or decrease in temperature over a period of time can affect neutrality. This would result in either carburizing or decarburizing.

At the end of the carbon restoration cycle, both the surface carbon content of the steel and the potential of the atmosphere should be about the same. Quenching at this point prevents excess carbon pick-up or carbon drop-off. It also saves money by making an additional hardening operation unnecessary.

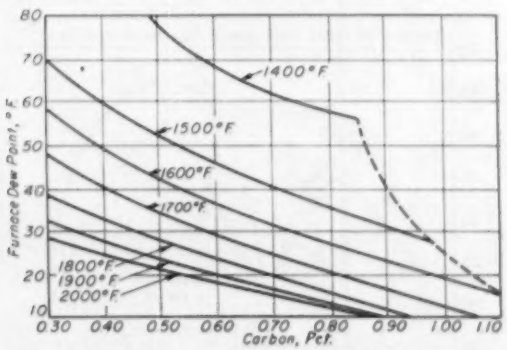


CHART shows the critical relationship of dew point and temperature in the control of carbon potential.

Samples slow cooled in pit-type furnaces have produced mixed results. Even with reasonably careful atmosphere control, the specimens usually show signs of excess carbon pick-up or slight surface decarburization.

Carbon pick-up, in excess of the carbon content of core material, may not be a problem in some applications. An earlier article in THE IRON AGE* reported it advantageous when parts were to be induction hardened after restoration.

When a part is to be welded, the unwanted carbon can do a lot of damage. The extra carbon can also cause trouble when subsequent machining operations place a maximum limit on hardness. A skin layer of high hardness can dull, or even break, tools.

The standard solution for high-surface carbon is a diffusion cycle. This means soaking the part at elevated temperature until some of the carbon near the surface has diffused inward. Again, protection against decarburization must be maintained either by means of copper plating or a protective atmosphere or both. Even when the diffusion cycle is successful, it results in increasing costs and slowing up production.

Need more answers

Restoring carbon to alloy steels should be approached with caution. Although success has been achieved with some of the more widely used alloy steels, relatively little is known about the mechanical properties of these materials after restoration. Even less is known about the effectiveness of certain alloying elements after depleted carbon has been restored.

The effect of carbon restoration on the effectiveness of the carbide-forming elements warrants careful attention. Vanadium is one example. Many vanadium-containing steels have secondary hardening characteristics. Will a carbon restored, vanadium-containing material exhibit these same characteristics? Questions of this sort have not, as yet, been adequately answered.

The scarcity of mechanical test data applying to carbon restored alloys is quite understandable. Acceptable mechanical tests specimens that have been carbon restored are very difficult, if not impossible, to prepare.

A fatigue specimen, decarburized and carbon restored, would very likely not have the surface finish and straightness required for valid testing. Altering the surface by polishing or other means would tend to invalidate the test.

Short of substantiating mechanical or operational data, the use of restored alloys for critical applications would seem to be a pretty risky business.

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* J. D. Armour, "Continuous Carbon Restoration Furnace Boosts Production," The Iron Age, April 17, 1952.

For conservation—

Low Nickel Type 329 Offers Good Corrosion Resistance

◆ Largely overlooked by American fabricators, Type 329 may sometimes be substituted for Type 316 . . . Nitric acid corrosion rates are as low as those for Type 304 . . . These, and other advantages, are spelled out for an alloy every fabricator should know more about.

By R. A. LULA, Research Supervisor, Stainless Steel Section, W. G. RENSHAW, Research Supervisor, Corrosion Section, and J. B. HILL, Research Metallurgist, Allegheny Ludlum Steel Corp., Pittsburgh

◆ TYPE 329 STAINLESS offers corrosion resistance that is almost as good as Type 316. It contains only 4 pct nickel. This means appreciable savings of a critical and rather expensive element. Because of its better-than-average properties, 329 alloy can be substituted for more critical materials in some industrial applications.

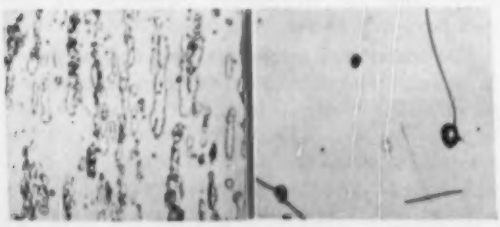
Sweden was quick to recognize the usefulness of 329 and put it to work on a large scale in sulphite pulp applications. The alloy has never achieved any appreciable popularity in the United States, possibly because the austenitic grades are easier to fabricate. The continuing possibility of a nickel shortage, however, indicates the wisdom of knowing how to make better use of the less critical alloy grades.

Structurally, Type 329 is a duplex structure alloy with a ferritic matrix and small austenite pools. It more closely approximates the 400 series of stainless steels, especially Type 446, in structure and properties. Its 4 pct nickel content is apparently the sole reason for including it in the 300 series. The 400 alloys contain residual nickel only.

The typical microstructure of Type 329 in the annealed condition is shown in Fig. 1. It consists of a matrix of ferrite with small elongated stringers of austenite and carbide. The amount of austenite varies from 20-40 pct.

Carbides always present

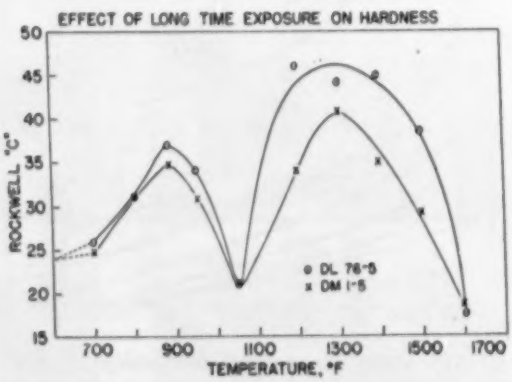
Carbides are always present even at very low carbon contents. They cannot be retained completely in solution when annealing from a high temperature. Above 1800°F austenite begins to transform to ferrite. At about 2300°F, the alloy is completely ferritic, but austenite again forms during cooling. Because this austenite is stable at room temperature, Type 329 can not be hardened by martensitic transformation.



Above—Left: FIG. 1—Microstructure of annealed Type 329, showing stringers of austenite and carbides. 100X

Above—Right: FIG. 2—Grain boundary precipitation formed during rapid cooling from above 1800°F. 1000X

Right: FIG. 3—The lower carbon heat seems to show greater sensitivity to sigma formation.



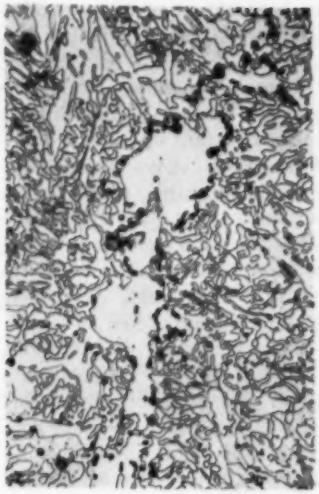


Table I

Heat	C	Mn	Si	Cr	Ni	Mo	N₂
DL-76-5	0.11	0.97	0.46	29.69	3.97	1.44	0.088
DM-1-5	0.21	0.83	0.40	27.41	3.91	1.35	0.088
DM-8	0.11	0.88	0.46	26.44	3.98	1.60	0.082
DL-68	0.18	0.86	0.49	27.26	3.98	1.60	0.080
DM-6	0.13	0.87	0.50	28.28	4.00	1.55	0.088

Left: FIG. 4 — Typical sigma formation after 50 hours at 1300°F in lower carbon heat, DL-76. 500X

Grain boundary carbide precipitation will occur during rapid cooling from above 1800°F. The typical precipitate is shown in Fig. 2. This type of precipitation is characteristic of all ferritic stainless steels. Unfortunately, it is accompanied by a substantial decrease in corrosion resistance. Welded material is especially prone to this form of attack.

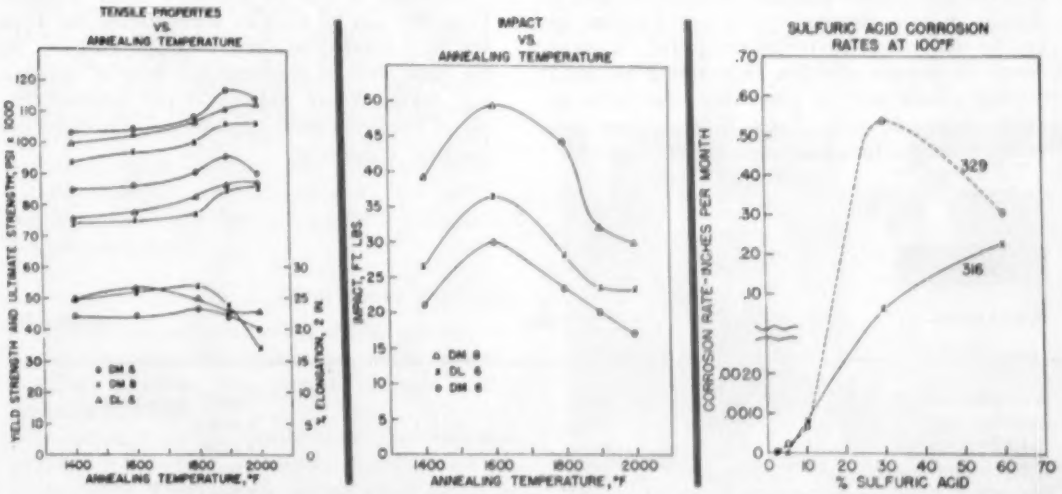
Hardening tendency

Type 329 is subject to both 885°F embrittlement and the formation of sigma phase. Significant increase in hardness occurs as a result of long time exposure in the 885°F and sigma-forming temperature ranges. This tendency to harden in certain sensitizing temperature ranges is shown in Fig. 2. The times and temperatures used for sigma formation were 50 hrs up to 1150°F and 100 hrs above 1150°F.

Heat DL-76-5, Table I, has higher hardness after exposure in the sigma range due to the higher chromium content.

Considerable sigma is formed if the alloy is held in the 1200°-1500°F range for sufficient time. This phase precipitates primarily in the ferrite as shown in Fig. 4. A hardness of 30-40 Rockwell C can be attained in 24 hrs at 1300°-1400°F. Although this could be used as a hardening treatment, considerable sacrifice in toughness would be experienced at the same time.

The mechanical and welding properties of 329 are essentially those of ferritic steels. This is because ferrite is the continuous phase of the material. Tensile and impact properties are shown in Figs. 5-6. They are presented as a function of



From Left to Right: **FIG. 5—Annealed at 1600°F, tensile and yield are better than average values for Type 316. FIG. 6—Impact shows a sharp decrease above 1800°F due to formation of acicular austenite. FIG. 7—Corrosion resistance is about equal for both alloys in 10 pct solution.**

STRESS CORROSION samples broke transgranularly in 16 hours in 42 pct M_gCl_2.

annealing temperature for typical melts.

Average tensile properties of the material annealed at 1600°F indicate a tensile strength of 90-105,000 psi, a yield of 70-85,000 psi and an elongation of 22-25 pct. Both tensile and yield in this state are superior to average values for Type 316 but the elongation is substantially lower.

Type 329 shows an increase in tensile and a sharp decrease in impact above the 1800°F anneal. This is due to the formation of acicular austenite during cooling. At 1400°F the impact strength is lowered by the inherent formation of sigma phase. Tensile properties are not similarly affected.

Welds tend to be brittle

Welding of Type 329 can be readily accomplished, but the welds tend to be brittle. If ductility is to be restored, the welded areas must be thoroughly annealed.

Primary interest in Type 329 centers about its good corrosion resistance. In the annealed condition the alloy exhibits excellent corrosion resistance—surpassing Type 304—in chlorides and sulphuric acid. In certain cases, it approaches Type 316.

Nitric acid corrosion rates are as low as those of Type 304. Apparently the influence of molybdenum in this composition is not harmful in strong oxidizing environments. The element seems to remain effective in avoiding localized pitting attack and in promoting resistance to dilute sulphuric acid. Table II lists some corrosion test data for an average heat of Type 329. This heat had a carbon content of 0.10 pct, Mn: 1.17 pct, Si: 0.46 pct, Cr: 26.08 pct, Ni: 3.96 pct, and Mo: 1.84 pct.

Sulphuric acid corrosion rates at 100°F are compared with Type 316 in Fig. 7. These types would be satisfactorily resistant up to 10 pct concentration at 100°F. Both alloys are rapidly attacked at elevated temperatures, except in extremely dilute solutions.

Where stress corrosion cracking is a problem, Type 329 behaves very much like other chromium-nickel types. This is probably due to the presence of austenite in amounts from 20-40 pct. Stressed samples tested in boiling 42 pct $MgCl_2$ broke transgranularly in 16 hrs. Type 446 will not crack in a test of this kind, but Types 304 and 316 can fail in 8-24 hrs under the same conditions. It seems that Type 329 is also subject to stress corrosion cracking where any of the 300 series might fail.

Annealing improves properties

The behavior of Type 329 in the welded condition is about the same as straight chromium, ferritic steels. Loss of corrosion resistance as well as ductility occurs in the heat affected area. Accelerated attack can be found in zones where, as a result of welding, the metal has been heated to above 1800°F and cools rapidly to precipitate grain boundary carbides.

In strong oxidizing acids such as nitric acid, as well as in chlorides, the sensitized zones are attacked readily. Both ferric chloride and copper sulphate-sulphuric acid solution can produce pronounced intergranular attack. Unlike the chromium-nickel steels, the addition of stabilizing elements, such as columbium, does not solve the problem. Neither does lowering carbon content. Annealing at 1800°F after welding will restore corrosion resistance and improve mechanical properties.

Provided it can be annealed after welding, Type 329 can be used as a substitute for Type 316 in a number of industrial applications. At the same time, it performs the duty of conserving nickel. Where welding is not involved, the use of Type 329 offers greater promise from the practical standpoint.

Table II

Corrosive Medium	Temperature	Corrosion Rate
65 Pct Nitric Acid	Boiling	0.00055 inches/month
Glacial Acetic Acid	Boiling	0.000012 " "
10 Pct Phosphoric Acid	Boiling	0.00056 " "
85 Pct Phosphoric Acid	200°F	0.0016 " "
Conc. Sulfurous (Liquid)	150°F	1.7x10-6 " "
Conc. Sulfurous (Vapors)	150°F	2.1x10-6 " " (No Pitting)
10 Pct Ferric Chloride	Room	Pitted 24 Hours
20 Pct Salt Spray	Room	No Rust or Pitting 8 Months
15 Pct HNO_3-3HF (Volume)	Boiling	0.115 inches/month

Find many uses—

Plastisols: Versatile, Low-Cost Protective Coatings

◆ Plastisols, introduced just 8 years ago as economical protective coatings for electroplating racks, are now applied to a wide range of metal products . . . With proper treatment they form dense, tough, flexible coatings.

◆ In various formulations, plastisols serve many specific needs . . . They can be compounded to varying degrees of hardness or to resist particular corrosive conditions . . . In colored form they improve product appearance.

By D. R. MESERVE, Electroplating & Coatings Dept., United Chromium Div., Metal & Thermit Corp., New York

◆ AS A CLASS of low-cost protective coatings for metals, plastisols have gained increasing attention from engineers, designers and product finishers. Since their commercial introduction 8 years ago, these coatings have widely expanded their range of applications.

For example, plastisols are now used on: fan blades and fume ducts for protection against corrosive atmospheres; steel drums to protect against product contamination; conveyor rollers to reduce noise level; wiring harnesses to resist moisture and fungus; dies to protect delicate surfaces; and on electrical tool handles to guard against shock. Even bolts, nuts and other fastening devices are now being coated for protection against abrasion.

Form dense coatings

In addition, surgical instruments, automotive parts, aircraft assembly fixtures, filter screens, pushcart bumpers, pipe, pumps—are now being plastisol-protected.

Supplied in liquid or paste form, plastisols are dispersions of finely powdered vinyl resins in plasticizers. They usually include small amounts of pigments and stabilizers. Unlike organosols, which contain a certain amount of diluent, plastisols are 100 per cent solids. They form dense, flexible, extremely tough protective coatings.

By varying the formulation of plastisols, they can be made to serve a variety of needs. They can be compounded to yield cured films of various degrees of hardness. Coatings as thick as 3/16 in. or as thin as 0.003 in. can be produced with just one application. In protecting metals against strong corrosives, a heavier film is usually specified. These insure against coating

TANK section, too large to be dipped, gets a fast spray coating of a new plastisol formula.

OVEN heat cures the plastisol coating on wire racks to a hard tough, flexible condition.

porosity and provide a resilient film which resists physical damage and absorbs impact without chipping or cracking.

Many plastisols develop films with high tensile strength that won't tear or scuff and will stand up under the heaviest abuse. These can outclass rubber in toughness, chemical inertness, and economy for many applications.

Plastisols were first used successfully in the electroplating field as protective coatings for racks. Since then they have found literally hundreds of new uses.

A large automotive plant, for example, experienced excessive maintenance costs on rubber-coated degreasing baskets. After switching to plastisols there was no coating damage whatever after three years of heavy production work. Electrocleaning and rinse tanks are other examples of equipment now plastisol-coated to protect against corrosion from aqueous solutions.

In many cases, these versatile films have permitted the replacement of expensive alloys with ordinary steel or cast iron. One manufacturer reported that his stainless steel baskets had to be coated repeatedly with beeswax to withstand the hydrofluoric acid used for etching glass apparatus. Now, ordinary steel baskets coated with plastisol not only prove more economical but more satisfactory.

Resist potent chemicals

Similarly, another firm reports satisfactory performance from plastisol-coated, half-ton cast iron strainer bodies, which were formerly made of stainless steel.

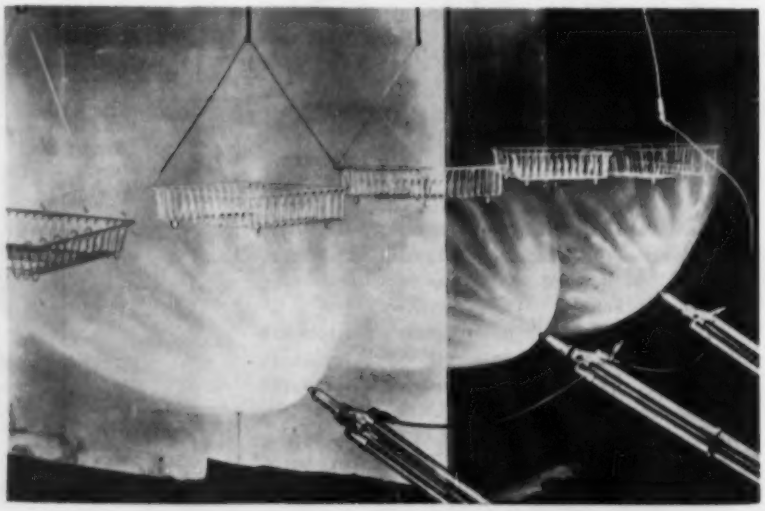
Still another case is that of a chemical processor who applied plastisols to bleach-reduction chambers. By so doing he was able to get four times more service, before maintenance, than he got previously from special alloy metals.

Because they are vinyl-based, heavy duty coatings with a 100 pct. solids content, plastisols are resistant to a wide variety of the more potent chemicals used in industry. For example, they will successfully withstand such strong acids as hydrochloric and sulphuric.

A large cellophane plant, plagued with costly corrosion of exhaust system ducts, eliminated the problem with plastisols. A nonporous coating approximately 1/16 in. thick fully protects the ducts against fumes of entrained sulfuric acid, hydrogen sulfide, and carbon disulfide. And a metalworking plant coats the fume exhaust hood on a pickling tank to withstand hydrochloric and nitric acid fumes.

Plastisols also have good resistance to strong alkalies such as sodium or potassium hydroxide, and to such corrosives as aqueous salt solutions, oxidizing agents, and reducing chemicals. Moreover, they will resist the action of alcohols and many wetting agents.

PLASTISOL is sprayed electrostatically on wire products for a fast, low-cost, dripless job. This new method of application is said to be twice as fast as conventional dip coating.



Most plastisols require curing temperatures ranging from 350 to 375°F. Unlike solution types of coatings which form films by evaporation of solvents, plastisols require heat to fuse into a homogeneous mass. The ingredients will remain in an unfused state until proper temperatures have been reached and held for a prescribed period of time. Upon baking, all the materials in the compound become a part of the resultant film or self-supporting shape.

Most plastisol coatings require a prime coat to assure good adhesion. Where adhesion is not needed, or where a strippable coating is desired, plastisols may be applied directly to unprimed surfaces. Primers are normally dipped, sprayed or brushed on and baked for 15 to 20 minutes at 300 to 350°F.

Plastisols can be easily and economically applied by dip, spray, roller coat, knife coat, trowel, and in some cases, by a caulking or flow-on principle. Many can be cast or slush molded; some are suitable for extruding and injection molding. As coatings for metals, they have been most widely applied by dipping and more recently by spraying.

In hot dip plastisol application, temperature plays an important part in controlling the degree of film thickness. Mass of the piece being dipped also affects the build-up of plastisol. Usually, the hotter the part, the thicker the applied coat.

A recent development, a cold dip plastisol, permits considerable savings in material consumption and production time. Until now, the best speeds obtainable with cold dip materials have been 6 to 7 ipm. The new cold dip plastisol allows dipping speeds of 17 to 18 ipm; thus it is ideally suited to automatic conveyor dipping equipment. The flow properties of this compound are such that it deposits approximately 50 pct less material than previous cold dip formulas.

Two major appliance manufacturers use this cold dip compound in pastel shades of coral and light green as an economical and attractive coating for freezer baskets and shelves. Other fabricators use it as a protective and decorative coating for such diverse wire products as fan housings, wire display racks, and chair backs, to name a few.

Spray electrostatically

A new sprayable product, known as Unichrome Coating 5300, has helped eliminate some of the problems encountered with pieces too large to be dipped. Previous sprayable materials seldom provided more than 0.006 in. of thickness per coat, usually much less. The new formulation produces thick, single-coat dry films with standard equipment and techniques. It can be applied at room temperatures to cold vertical surfaces and will give dry film thicknesses of 0.025 in. without sagging.

First successful process for electrostatic spraying of plastisols was announced jointly this year by Scientific Electric, Garfield, N. J., manufacturers of high frequency and high voltage equipment, and United Chromium Div. of Metal & Thermit Corp.

REFRIGERATOR racks are dip-coated with green-tinted plastisol for wear and appearance.

The new process is more than twice as fast as conventional dip-coating; completely eliminates plastisol wastage due to "running"; drastically reduces handling and produces a superior coat. The entire coating operation can be conveyorized; and the actual spraying is automatic.

Shorten curing time

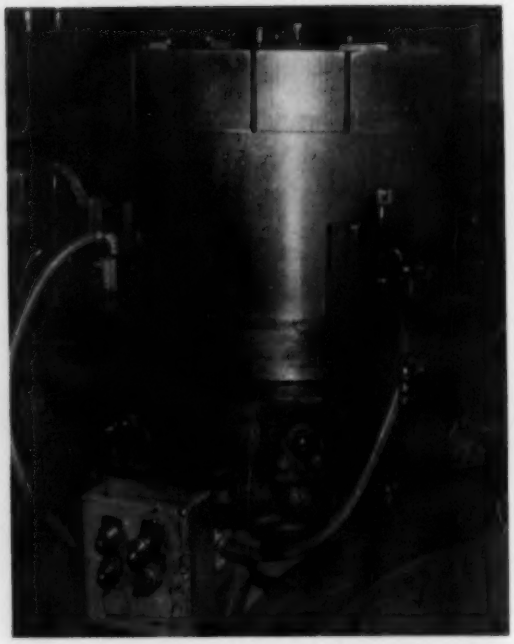
When applied by spray or dip techniques, plastisols prove considerably less expensive than sheet linings; chiefly because there are no joints or splices to close up. This saves time in application and also affords the advantage of seamless protection free of hazardous air pockets.

As an example, the plating division of an automobile company found that the sprayable Unichrome coating 5300 protected the outside and inside surfaces of rinse and electrocleaning tanks for less money than it formerly cost to line just the interiors with plastic sheets. Moreover, the plastisol provided seam-free, tightly bonded coatings which assured against undercutting.

Another example of effective protection plus economy is shown by a plant which compared the performance of plastisol-lined tumbling barrels with that of barrels lined with synthetic rubber. Subjected to the roughest kind of production for 9 months, the plastisol proved more durable than equal thicknesses of rubber—yet cost only half as much.

Speed of curing is another important factor in the coating economy obtained with plastisols. This can also have a direct bearing on ultimate product cost. Depending on the size of the part coated and the temperatures involved, plastisols can be cured to stable form in from 20 to 30 minutes. When compared with some coating materials that require hours of curing time, the savings are readily apparent.

RING of sheet steel is quickly welded under heavy roll pressure to form the tube wall.



MACHINE expands tub ring 1 in. circumferentially and forms a step near the bottom edge.

On washer tubs—

Resistance Welding Simplifies Presswork

◆ To produce quality washing machine tubs with speed and economy, Whirlpool Corp. makes extensive use of automatic seam welders . . . By welding tub walls and bottoms, deep drawing operations are eliminated.

◆ Seam welding also permits savings in sheet steel; parts are blanked to the required size with little waste . . . Brushing machines clean all welds before tubs are enameled.

By J. H. BAUER, Mfg. Engineer,
Clyde Div., Whirlpool Corp. Clyde, O.

◆ AUTOMATIC SEAM WELDING is an important factor in the rapid and economical production of tubs for automatic washing machines at Whirlpool Corp.'s Clyde, Ohio, plant. In making seam-welded rather than drawn steel tubs, only two heavy-press dies are needed. Welded construction also means that most of the tub-production equipment is of the light, high-speed variety, and that metal consumption is kept to a minimum, with little waste.

For making tub bottoms only two large presses are required. These are also used for other work. One of the presses produces tub bottoms and, as they require only a narrow flange, the draw is a shallow one. Piercing and trimming are done in a second run in the same press on a die adjacent to the draw die. A restrike die is run in another press. All other tub-making operations are performed on a line in another department.

Production of tub walls along this line starts with the blanking of 19-gage enameling sheet into strips measuring 14½ x 67 in. The strips are then fed by hand into straight rolls that form cylinders with a 90° overlap. These workpieces are passed to a Resistance seam welder and loaded one at a time over a cylinder and inside a split ring and shoe combination. Loading is done in such a way that there is only 3/32-in. overlap which is centered between the welding rolls. The work is then air clamped in position.

Brush welds clean

As soon as the tub ring is clamped in place, the machine starts automatically and its rolls produce the weld. Water sprays help to keep the rolls at a moderate temperature. Pressure applied by the rolls is such that the final weld thickness is only 60 pct of the initial thickness.

After its removal from the welder, the operator places the ring in a special weld-brushing machine. This unit has two Osborn wire brushes that rotate, one inside and one outside the weld. They clean off any scale that would interfere with the adherence of the vitreous enamel applied to the tub after it is completely assembled.

The rotating brushes are slightly skewed instead of being in planes parallel to the weld. This insures better brushing action while the ring is traversed between the brushes.

Next, each ring is set in a Grolner expander where its circumference is increased one inch. This sizing operation also serves as a check on weld strength inasmuch as a weak weld would fail during the process. In the expander, a step is formed near the edge of the tub-wall ring; the diameter of the step being such as to make a tight fit inside the cylindrical flange of the stamping which makes up the tub bottom.

Assembly of the tub bottom to the wall ring is done with the aid of a light hydraulic press built into the gate of another Resistance seam welder. A ring and bottom section are set into correct position in the fixture of the welder and clamped. The assembly is then rotated along with the fixture, and the weld is made by twin rolls, one inside and one outside the seam.

This weld crosses the longitudinal weld made previously, but tight joints are readily obtained without any special precautions other than the aforementioned brushing of the first weld.

When the circumferential weld is completed, it is also wire brushed on each side. This operation uses a machine in which the work is rotated slowly between two brushes set slightly askew. They accomplished the same purpose of removing scale from the weld surface.

Each tub is then put into a light press that rough pierces a side hole near the bottom and forms an outward dimple or boss around this hole. The tube is then inverted over a special hydraulic press and set so that holes in its bottom register with locators to fix a correct angular position.

This press has two external dies and five punches that register with holes in the dies. All five punches are forced outward when a hydraulic valve is opened. As this is done, the tub is held firmly against a base plate. Four of the five punches pierce attachment holes near the top of the tub-wall (which is down in the machine) and the fifth punch finish pierces the side hole which was previously rough pierced. This completes the forming operations and tubs are then hung on a conveyor for advance to the vitreous enameling department.

SMALL press in the seam welder gate (right) forces the tub bottom over a step in the ring.

FINAL forming on tub is done by radial hole punches that move outward to pierce the wall.

The story of 5 benefits Wayne Screw Products

Rocking-type fixture—

Handling Device Speeds Quenching

Hautau rocking arm, whose fingers grip the coil as it rolls between them and is automatically positioned longitudinally. At this instant, the arm picks up the hot coil and rocks about 150 deg, where the coil comes to rest in the automatic quenching machine.

Upon reaching this position, the fingers automatically unlock and slightly retract, releasing the coil. Thereupon the coil, now in position to be advanced through the oil quench, is so advanced, just as when hand loading was done.

As the new rocking unit is fully automatic, no operator is required.

◆ LOW-COST automation devices are finding increasing favor where opportunities to save manual handling can be found.

One example of this is a new rocking-type of handling fixture now used at the Buick Motor Div., Flint, Mich., for moving suspension coils springs to an automatic quenching machine.

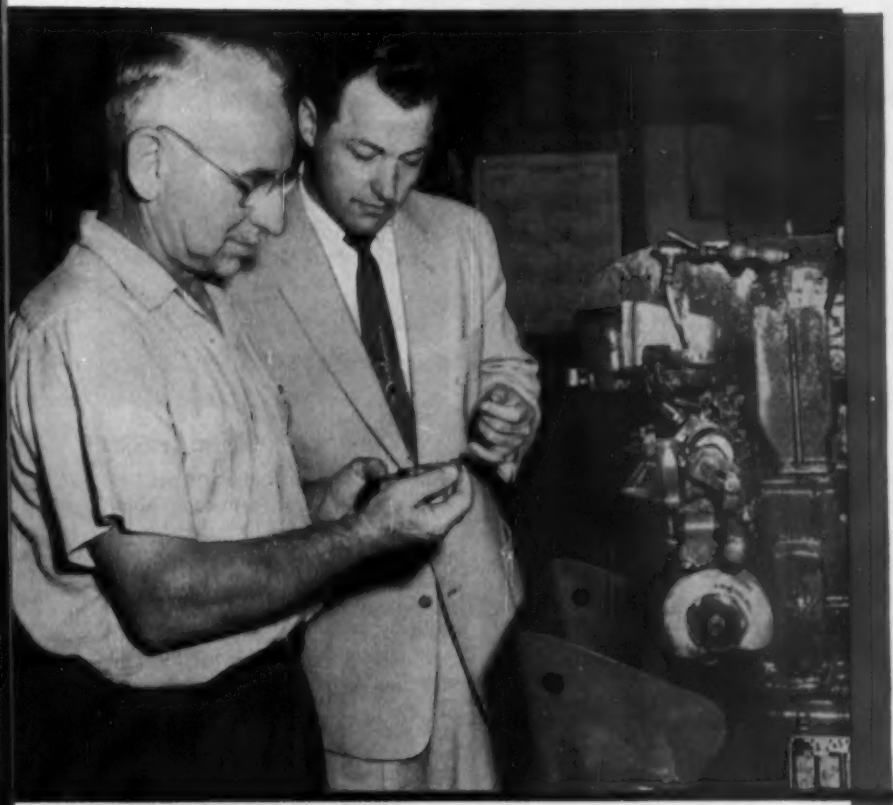
After bar stock has been cut to length and is heated to a red coiling temperature, each bar drawn from the furnace is coiled around a mandrel that includes a helical groove, as has been done for several years. After the mandrel is withdrawn the coil, still hot, rolls down an incline. Formerly it was picked up by tongs to place it in an automatic oil quenching machine.

Added to the setup recently is an automatic

COIL SPRINGS are formed on rotating mandrel in machine, left, coils then roll down incline to fix-

RED HOT coil is gripped by the fingers at the end of this rocking arm, which rotates it, drops the coil into the quenching medium at right and then rocks back to repeat the cycle.

The story of 5 benefits Wayne Screw Products gets from using STANICUT CUTTING OIL



Plant Foreman Al Ziegman (left) and Standard industrial lubrication specialist L. J. Loomis examine pitch diameter of screw threads. L. J. Loomis' engineering background plus his field experience in industrial lubrication, customers find, pays off *for them*. Lee is a graduate of Tri-State college of Indiana with a B.S. degree. Before entering field work, he completed Standard Sales Engineering School.

STANICUT Oil 137 BCS solved finish problem for Wayne Screw Products Company, gave better finish on screw and machined parts like these—plus four other important benefits.

Management at Wayne Screw Products Company, Detroit, found they were not getting a completely satisfactory finish on aircraft quality stainless steel, which the plant was machining. They followed a suggestion made by their Standard Oil lubrication specialist to switch to STANICUT Oil 137 BCS. The result: five benefits.

1. Better finish
2. Higher quality work
3. Longer tool life
4. Higher production because of less down time for tool sharpening and adjusting
5. Cutting oil costs reduced approximately 50%

At first STANICUT Oil 137 BCS was used in two automatic screw machines—a National Acme Multi-Spindle and a Brown & Sharpe Single Spindle. Production benefits prompted Wayne Screw Products to convert other equipment to STANICUT Oil 137 BCS—and with similar results.

Delivering benefits like this is an old story for STANICUT Oil 137 BCS. A Standard Oil lubrication specialist will be happy to demonstrate how Standard's cutting oils can perform with similar results for you. In the Midwest, a call to your nearby Standard Oil office will bring a prompt response. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
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• Edited by GEORGE BLACK

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New Technical Literature

Catalogs and Bulletins

Propeller fans

Two new models, a By-Pass Duct Fan and a Double Ring Reversible Fan are included in the latest propeller fan catalog published. In addition, specifications, dimensions, and performance figures are given on 18 other types of industrial ventilating fans plus intake units, unit heaters and accessories. *Hartzell Propeller Fan Co.*

For free copy circle No. 1 on postcard, p. 89.

Special belt constructions

A new data sheet on special conveyor belt constructions is available. Featured is Riffle Grip conveyor designed to retain or separate water content from the load during belt travel on inclined conveyors. *B. F. Goodrich Industrial Products Div.*

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Material handling

A new folder explains how modern materials handling equipment can pay for itself out of savings. It describes the Earn-Its-Own-Way leasing and extended payment plans now available on all trucks and accessories made by Automatic. *Automatic Transportation Co.*

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Unloading

Complete details on unloading, and how all materials are transported and high-stacked with maximum efficiency, are included in Certified Job Study No. 152 which is available. *Towmotor Corp.*

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Howell motors

A booklet describes the company's precision built motors as to: electrical characteristics; enclosures and cooling; mountings and auxiliaries; characteristics. It contains tables and illustrations. *Howell Electric Motors Co.*

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Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 89.

Hand trucks

A new illustrated bulletin that provides complete information about the company's line is available. In addition to specifications and technical data on the product line, the literature introduces a new hand truck selection plan, which tells the user how he can custom design a Magliner hand truck to meet his exact job requirements. *Magline Inc.*

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Stainless steel finishing

Finishing methods and procedures for cutlery, antomotive moldings, cooking ware plus many other items are included in a new bulletin. This bulletin also describes how manufacturers may avail themselves of the Stevens Customer Service L. V. Report Service at no obligation. *Frederic B. Stevens, Inc.*

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Tape dispensers

Industry's most complete line of dispensers and taping machines for pressure-sensitive tapes is described in a new 16-page manual now available. The manual contains 50 illustrations of the more than 75 dispensers and taping machines available, plus a complete index listing the types of Scotch brand tape that can be used with each unit. *Minnesota Mining & Manufacturing Co.*

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FREE TECHNICAL LITERATURE

Air impactool

A new catalog which is devoted entirely to the problem of running nuts, bolts, cap screws, and other type fasteners is available. It contains illustrations, specifications and the equipment furnished with each tool. A two page spread is devoted to each size. *Ingersoll-Rand Co.*

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Enclosed switches

Published as an aid to the plant engineer and maintenance man, as well as the designer of original equipment, catalog 83 describes in detail the wide variety of industrial enclosed switches which are designed for use on either AC or DC industrial applications. *Minneapolis-Honeywell Regulator Co.*

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Rod parters

A new 14-page manual illustrating how a Di-Acro rod parter cuts round, square, rectangular and hexagon bar stock without rough edges or burr is announced. Specifications and capacities on both hand and power operated Di-Acro rod parter are listed in table form for easy reference. *O'Neil-Irwin Manufacturing Co.*

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Flexidyne

Information about Flexidyne is contained in a 12-page booklet. It includes illustrations of the Flexidyne, cross section engineering drawings of the Flexidyne drive with Taper-Lock sheave and the Flexidyne coupling with Taper-Lock bushing. Dimensional drawings and list prices are also included. *Dodge Manufacturing Corp.*

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Polishing heads

Bulletin 102 contains a comprehensive account of the Vonnegut brush-backed polishing head and the various models available. Many pictures of the polishing heads in actual operation along with some of the suggested machine mountings are shown. Versatility of the polishing heads is stressed. *Grinding & Polishing Machinery Corp.*

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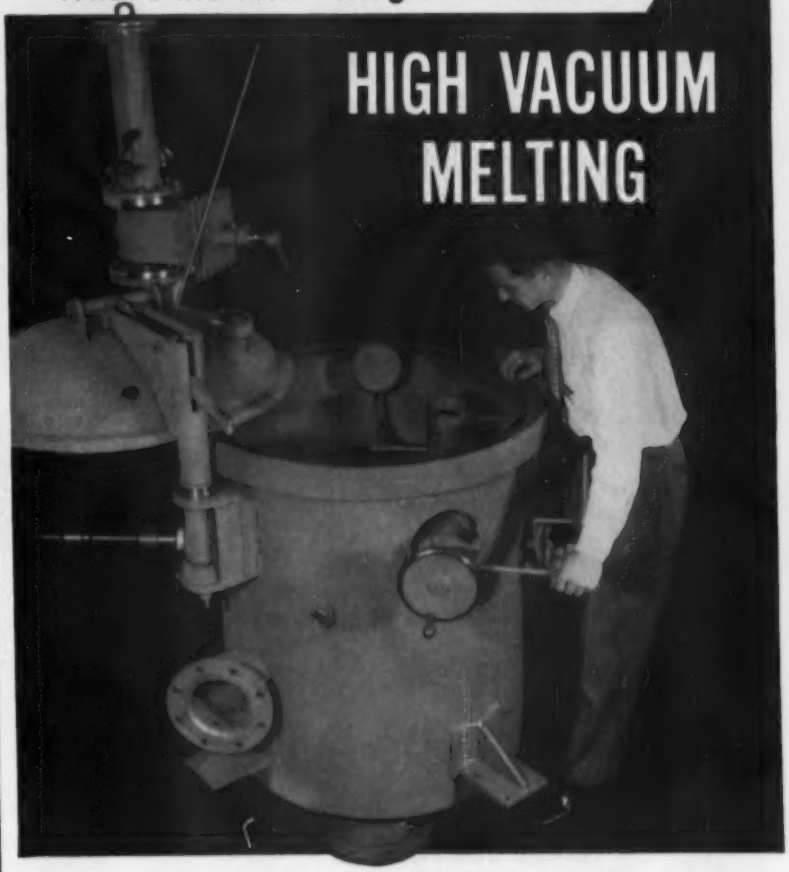
What's the New "Magic" in Metals?

HIGH VACUUM MELTING



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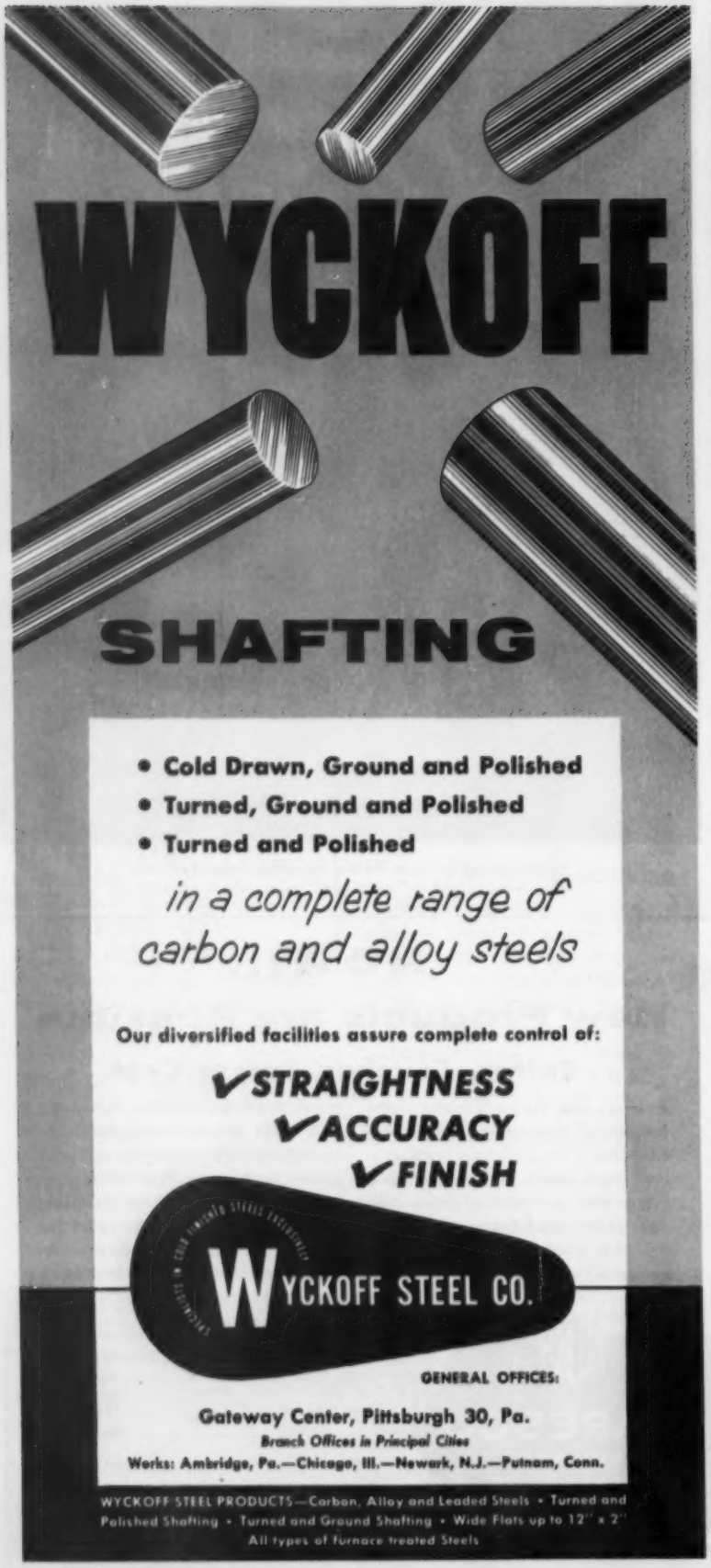
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WYCKOFF STEEL PRODUCTS—Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Wide Flats up to 12" x 2"
All types of furnace treated Steels

FREE TECHNICAL LITERATURE

Three-Phase

A patented power-saving principle of operation is described with diagrams and tabular data in a new bulletin. Three-Phase offers real value such as: lower installation costs, lower power bills, no expensive current compensators, greater weld consistency, much longer electrode tip life. *Sciaky Bros., Inc.*

For free copy circle No. 14 on postcard, p. 89.

Aluminum alloys

A brochure which fully describes the commercial aluminum alloys is available. The brochure explains in detail the general properties, fabricating characteristics, typical applications, and available size ranges of each alloy. Also included are alloy designation, weight comparison, and temper designation charts. *Peter A. Frasse & Co., Inc.*

For free copy circle No. 15 on postcard, p. 89.

Direct readers

New technical bulletin No. 44 provides a detail description of improved models Direct Reading Spectrometers featuring the Automatic Servo Monitor. Operation and construction of Direct Readers are outlined in this 8-page bulletin with diagrams and photographs. *Baird Associates, Inc.*

For free copy circle No. 16 on postcard, p. 89.

Industrial gears

An 8-page gear brochure is now available. Extensively illustrated, the brochure shows detailed information on the company's complete gear and axle shaft lines which includes spur, helical, spiral bevel, hypoid, straight bevel, Zerol, flywheel ring gears, and spline shafts. *Detroit Bevel Gear Co.*

For free copy circle No. 17 on postcard, p. 89.

Roller chain sprockets

Finished bore roller chain sprockets that can be quickly installed without reworking are now being introduced. They are made of high carbon steel, ready for hardening, and come in a wide range of popular sizes. A catalog sheet containing descriptions and specifications of the new finished bore sprockets is available. *Morse Chain Co.*

For free copy circle No. 18 on postcard, p. 89.

NATIONAL METAL EXPOSITION *and* CONGRESS...

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Whatever is on your mind about metals . . . you'll find the answers at the Metal Show! Here will be everything that's new and improved . . . from fabricating to finishing . . . from testing to engineering! What's more, you'll learn about the metals of tomorrow from experts discussing their findings in extremely interesting technical sessions scheduled daily for your convenience!

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WHITLEY COLLINS

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"Our recent Payroll Savings Campaign at Northrop demonstrated the belief of our personnel and our company in the basic fundamentals of American good citizenship—staunch support of our Country and personal thrift.

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Northrop Aircraft Company

If less than 60% of your personnel are Payroll Savers, do something about it. A phone call, telegram or letter to Savings Bonds Division, U. S. Treasury Department, Washington, D. C., will bring prompt assistance from your State Director. He will help you install, or revitalize a Payroll Savings Plan, through a simple, person-to-person canvass which your personnel will be glad to conduct. That's all you have to do—your men and women will do the rest.

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The **Iron Age**

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 84

Milling machines

A new bulletin illustrating and describing the new Axelson models 10R ram turret vertical milling machine and 10RH ram turret duplex milling machine is announced. The machines are very versatile, featuring large machine capacity and true exponents of "all-angle" milling. They are particularly suited for making metal patterns, dies, jigs, and for general manufacturing of all types. *Axelson Manufacturing Co.*

For free copy circle No. 19 on postcard.

Radius turning attachment

A newly designed radius turning attachment is now being produced. With a capacity from 0 to 4 in., this attachment allows the radius to be pre-set to a finished diameter. *The Wade Tool Co.*

For free copy circle No. 20 on postcard.

Operations and products

A booklet which demonstrates Shieldalloy's use of modern methods and facilities in the processing of welding rod materials, master alloys, and other specialized metallurgical and ceramic products is available. *Shieldalloy Corp.*

For free copy circle No. 21 on postcard.

Gear making

A portrayal of gear making, with many close-up photographic views of operations reproduced in multicolor, is presented in a new 44-page brochure. Approximately 100 photos, graphs, tables and technical views are shown. *Sier-Bath Gear & Pump Co., Inc.*

For free copy circle No. 22 on postcard.

Hole punching units

Wales type CJ hole punching units for punching mild steel up to ¼ in. thick are described in a 16-page catalog. The units are self-contained, with punches as part of the units, rather than attached to the press ram. *Wales-Strippit Corp.*

For free copy circle No. 23 on postcard.

Saws

A catalog describes and illustrates the complete line of Starrett hacksaws, hole saws, band saws and band knives. It includes descriptions, illustrations, application data and reference tables covering hand and power hacksaw blades, hacksaw frames, hole saws, etc. *The L. S. Starrett Co.*

For free copy circle No. 24 on postcard.

Design file

A new edition of Design File for rubber-phenolics is available. The popular brochure has been expanded to include the latest rubber-phenolic applications tested in electrical equipment, appliances, electronics, and machinery. *General Electric Co.*

For free copy circle No. 25 on postcard.

Time recorder

The time recorder + totalizer, which provides a continuous operation record of any electrically operated machine or process, has been introduced. Chronologically marked tape, from a large roll, continuously passes through this instrument recording the time and length of every "on", every "off" period of the equipment. *Heat-Timer Corp.*

For free copy circle No. 26 on postcard.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 9/8/55

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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
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Grinding equipment

A 6-page catalog describes Thorns Universal T2 tool and cutter grinder. It includes specifications, technical information, illustrated section on applications, description of Helix grinding equipment, and special equipment available. *Homestrand, Inc.*

For free copy circle No. 27 on postcard.

Compressors

Feather Valve compressors from 75 to 350 horsepower is the subject of a new bulletin. Fourteen major advantages on installation, operation and maintenance costs are outlined for types YC and DYC compressors. Information and illustrations are offered on component parts. *Worthington Corp.*

For free copy circle No. 28 on postcard.

Plummer blocks

A folder describes and illustrates Pollard's plummer blocks. Specifications are given for: double row self-aligning ball bearing plummer blocks, double row self-aligning ball bearing angle plummer blocks, single row self-aligning ball bearing plummer blocks, and single row self-aligning roller bearing plummer blocks. *Pollard Bearings Ltd.*

For free copy circle No. 29 on postcard.

Pilotair valve

A new design of seal made from a new, oil resistant material gives the type D Pilotair valve long life with minimum maintenance. This valve is described in a booklet which includes the versatility of the operating mechanisms and uses. *Westinghouse Air Brake Co.*

For free copy circle No. 30 on postcard.

Melting furnace

Ajax Tama Wyatt 100 KW low frequency induction furnaces are described in a brochure. It includes: principle of operation; description; advantages; applications. It also contains diagrams. *Ajax Engineering Corp.*

For free copy circle No. 31 on postcard.

Inclinable presses

A brochure on open back inclinable presses is available. It describes presses designed to meet the specific requirements of cutting, punching, stamping, shallow drawing and forming operations. A 2nd brochure details maintenance instructions for LK air-operated clutch and interconnected Flex-Disc brake with single point adjustment. *Ferracute Machine Co.*

For free copy circle No. 32 on postcard.

Aluminum

Two booklets concerning aluminum are available. One describes finishes and protective coatings for aluminum building products. The 2nd discusses the care of aluminum during storage, handling, installation, and erection. It includes sections on restoration of damaged aluminum surfaces. *Aluminum Co. of America.*

For free copy circle No. 33 on postcard.

Powerturn lathes

Bulletin 60 describes the company's complete line of powerturn lathes. It includes illustrations of the various size lathes plus their many features such as positive brake, micrometer carriage dial, computing head, etc. *The Lodge & Shipley Co.*

For free copy circle No. 34 on postcard.

Lever arm buckets

A new 24-page catalog on 2, 3, and 4 line clamshell buckets, classified for cement, chemical, and fertilizer industries is available. Included are classified tables of some 60 different sizes of buckets, containing weight, dimensional and capacity data. *Blaw-Knox Co.*

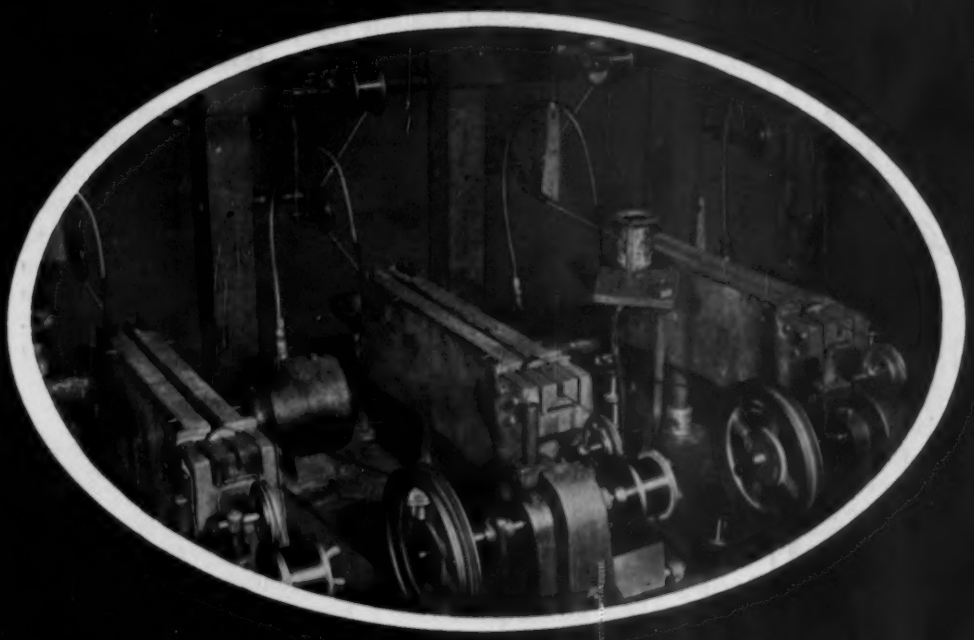
For free copy circle No. 35 on postcard.

Specialty steels

A new 32-page illustrated guide to specialty steels is now available to all steel users. The booklet defines the distinctive characteristics of a broad range of special purpose steels in terms of end use. *The Carpenter Steel Co.*

For free copy circle No. 36 on postcard.

dag
DISPERSIONS®



Die life extended with 'dag' dispersions

Use **'dag'** Colloidal Graphite when drawing fine wire through diamond dies: it is the only substance which will adhere to the heated wire and lubricate the dies. Not only does this *dry lubricating film* extend the life of the dies, but it produces wire of uniform diameter without the scoring and breakage frequently encountered with inferior lubricants.

Tungsten and molybdenum, notably difficult to work, are easily drawn through dies lubricated with a dilute mixture of **'Aquadag'®** and sugar solution.

To lubricate dies used in forming steel wire, a dilution of **'Prodag'®** and water is recommended. Users report more than 2200 pass-pounds per gallon of mixture with no graphite visible on the finished wire.

'dag' dispersions are also used profitably in forging, stamping, deep-drawing, piercing, casting, and stretch-forming. Write for our free booklet on **'dag'** Colloidal Graphite for Metalworking Operations, Bulletin No. 426-R2.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

use 'dag' dry films for trouble-free lubrication

ACHESON COLLOIDS COMPANY
PORT HURON, MICHIGAN
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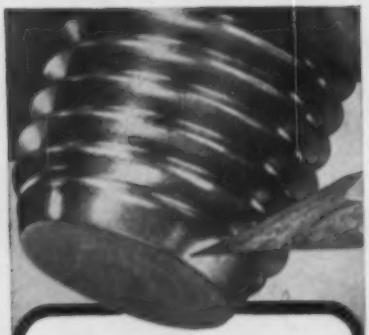


TOUGHER!

Allen

LEADER POINT CAP SCREWS

Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, *plus* the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold *only* thru leading Industrial Distributors.

ALLEN

MANUFACTURING COMPANY

Hartford 2, Connecticut, U.S.A.

MACHINING: Faster Cutting

Lathe converted to use three cutter heads simultaneously replaces conventional horizontal boring mill . . . More than doubles production.

Boring time for large SAE 1045 cast steel drill hook housings was more than halved recently at Byron Jackson Co., Los Angeles, when a 10-year-old Axelson heavy duty lathe was converted to use simultaneously three cutter heads, each equipped with four standard Kennametal tools.

Previously a conventional horizontal boring mill was used to complete the operation by boring and counterboring three separate diameters in each housing. Bulky size of the 15-23 in. diameter, 28-58 in. long castings, though, coupled with heavy stock removal requirements and excessive extension of the boring bar, limited production to only one casting per shift.

Conversion Method

The Axelson lathe was converted to a special purpose horizontal boring mill by removing the cross slide and mounting to the carriage a rugged saddle fixture with changeable shoes for accurate and fast set-up for various size castings. A hydraulically-controlled unit, attached to the end of the converted machine, actuates a slide support for the extended end of the boring bar—retractable for loading and unloading castings.

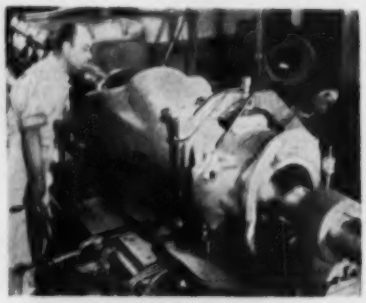
A two-piece boring bar with three movable cutter heads for facing to different shoulder dimensions was then bolted directly to the spindle nose. Counterbores in each cutter head locate four circular tool holders and milled key slots back up the tools during the rough boring and facing cuts.

Because of the high number of sand inclusions in the castings, tools are changed after each cut for free cutting and true bores.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

The housings are rough and finish bored at three stations simultaneously and then faced and counterbored in 3½ hr as compared to the old time of 8 hr.



Converted lathe . . .

Instruments:

Equipments measures impact without shock wave errors.

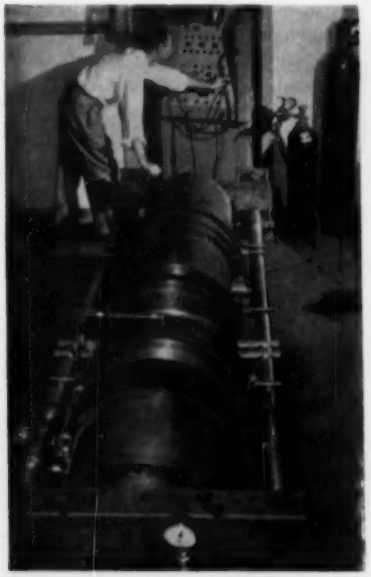
An "impact tube," for measuring effect of impact on metals and plastics, describes impact in terms of dynamic stress-strain relationships, weeding out the effects of waves propagated by sudden shock.

Developed by the Research Division of NYU's College of Engineering, the instrument consists of a 14-ft steel tube of 18-in. diam, divided into three chambers, a static, dynamic, and firing. The test specimen, a circular metal plate, mounts

between static and dynamic chambers.

Plastic Diaphragm

The other end of the dynamic chamber is sealed with a plastic diaphragm supported by a pneumatically controlled piston. Pressure is built up equally in static and dynamic chambers.



Measures impact...

Impact is applied by a carefully controlled simulated explosion. First the diaphragm is ruptured. This sends an expansion wave from the mouth of the dynamic chamber to the specimen. Pressure at the specimen position drops in about one one-hundredth second. The onrushing pressure from the static chamber slams against the specimen. This constitutes the impact loading. Force can be varied by changing the length of the dynamic chamber.

Unwanted Effects Minimized

Wave propagation effects in the impact test are minimized by the flatness of the expansion wave created in the dynamic chamber. With the instrument, impact effects can be measured over the entire face of the specimen. Signals transmitted from pressure gages and transducers to the specimen are photographed as they move across an oscilloscope screen.

Shuts Doors, Windows, Stops Conveyors

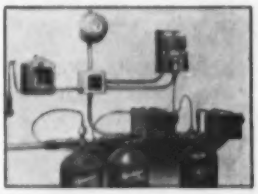
Sounds Alarm...

KILLS TOUGH FIRES!

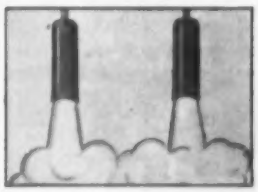
Randolph

EXTINGUISHING SYSTEMS

A fire! And the sensitive detector sends current to an alarm and storage tanks!



Doors and windows close . . . conveyors stop automatically. Powerful carbon dioxide pours through the feed lines.



Giant-size "CYCLONE" nozzles deliver the fire-killing punch . . . flood the entire room in 15 seconds!

Where your fire hazards are severe and areas are large or inaccessible . . . play safe! Be ready and secure with a *fast action* Randolph Automatic Fire Extinguishing SYSTEM!

At the first spark or flicker of flame . . . hundreds of pounds of powerful, non-damaging carbon dioxide flood the entire area . . . reach into every corner . . . stop the toughest fire . . . *all* automatically . . . *all* in a few seconds!

Thermostats set off alarms and immediately release a fire killing charge of CO_2 from stored cylinders through pipelines to overhead nozzles . . . the CO_2 charge smothers the fire with a heavy snow blanket. This charge can also shut doors, close windows, shut off motors, fans, conveyors, gas lines and close ducts . . . all automatically.

Send for Randolph's free FIRE HAZARD INDEX recommending the correct equipment for protection against any of the 580 typical fire hazards that might exist on your premises. Randolph's System Engineering Service is also available without cost or obligation. Write today: Randolph Laboratories, Inc., 9 E. Kinzie St., Chicago 11, Ill.

POWDER METALLURGY
can duplicate this part for

61% LESS

MACHINED PART — 18¢
POWDERMET* PART — 7¢

Don't cut parts—*Cut Costs!*
—with YALE Powdered Metal Parts

When it comes to keeping production costs down, American industry turns more and more to powder metallurgy. For here are tough, accurate parts completely ready for assembly...that not only do the job more cheaply, but often *better!*

With identical machined parts, most of the cost goes into the expensive machining operation. The price of *one* machined part will buy up to *six* of the same parts in powdered metal!

Close tolerances, excellent wear-ability, and controlled porosity are established Powdermet* virtues. Special properties—such as self-lubrication, or unusual electrical characteristics—can also be achieved. Alloys are available exceeding the tensile strength of mild steel.

The answer to your production problems may well be Powdermet* parts...and Yale & Towne. For Yale & Towne has the experience and know-how to serve you best in this rapidly-developing new field.

A qualified Yale & Towne engineer is available to discuss the advantages and limitations of powdered metal parts—*right in your own plant!* He will show you how powder metallurgy may cut costs in your production operations. There is no obligation for this engineering counsel.

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Filters	Gears
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Heat Treating:

Symposium on techniques slated for October metals show.

Two sessions on heat treating are planned for this year's American Metals Congress, to be held in Philadelphia Oct. 18-19.

The Industrial Heating Equipment Association, sponsoring the symposium in cooperation with the American Society for Metals, says emphasis will be on practical, dollar-saving innovations and techniques. Seven leading executives will present industry-wide reports on late developments.

First Session Program

The first session, to be held at 2 p. m. Tuesday, Oct. 18, will be on the general theme "Furnaces, Combustion Equipment and Induction Heating." Speakers will be: Frank Chesnut, Electrical Engineer of Ajax Electrothermic Corp., who will talk on "Vacuum Melting By Induction and Arc"; Floyd Olmstead, President of the Lee Wilson Engineering Co., "Batch Type Strip Annealing Furnaces—Multiple and Single Stack"; and Fred Bloom, President of Bloom Engineering Co., "Combustion Systems in Steel Plants."

Second Day Speakers

The second session, to be held at 2 p. m., Oct. 19, will have the general topics of "Mechanized Heat Treating Equipment and Its Application" and "Metallurgical Aspects Associated with Induction Heating."

Speakers will be: L. Rosseau, Vice-President of Ajax Electric Co., who will talk on "Mechanized Molten Baths"; Martin Neumeyer, Chief Research and Development Engineer of Sunbeam Corp., "Mechanized Batch Type Furnaces"; G. McCormick, Vice-President of Industrial Heating Equipment Co., "Mechanized Continuous Type Furnaces"; and Dr. H. Osborn, Technical Director, Tocco Div., Ohio Crankshaft Co., "Metallurgical Aspects Associated with Induction Heating."

Groceries . . . miracle of BRICK

Colorful cans, gleaming bottles, eye-catching cartons riding in the cart—not a single one of them would be there were it not for refractory brick. Brick that makes steel. Brick that makes glass. Brick that makes paper.

Everything that's made and everything that's moved starts with refractory brick in one form or another, lining the furnaces of industry. The requirements are almost infinite in variety.

To provide the truly complete refractory service that industry needs, General Refractories employs the world's largest refractories research laboratory; brings materials across oceans; manufactures in plants strategically located to serve industry swiftly . . . dependably . . . economically . . . everywhere.

GENERAL REFRACTORIES COMPANY, Philadelphia 2

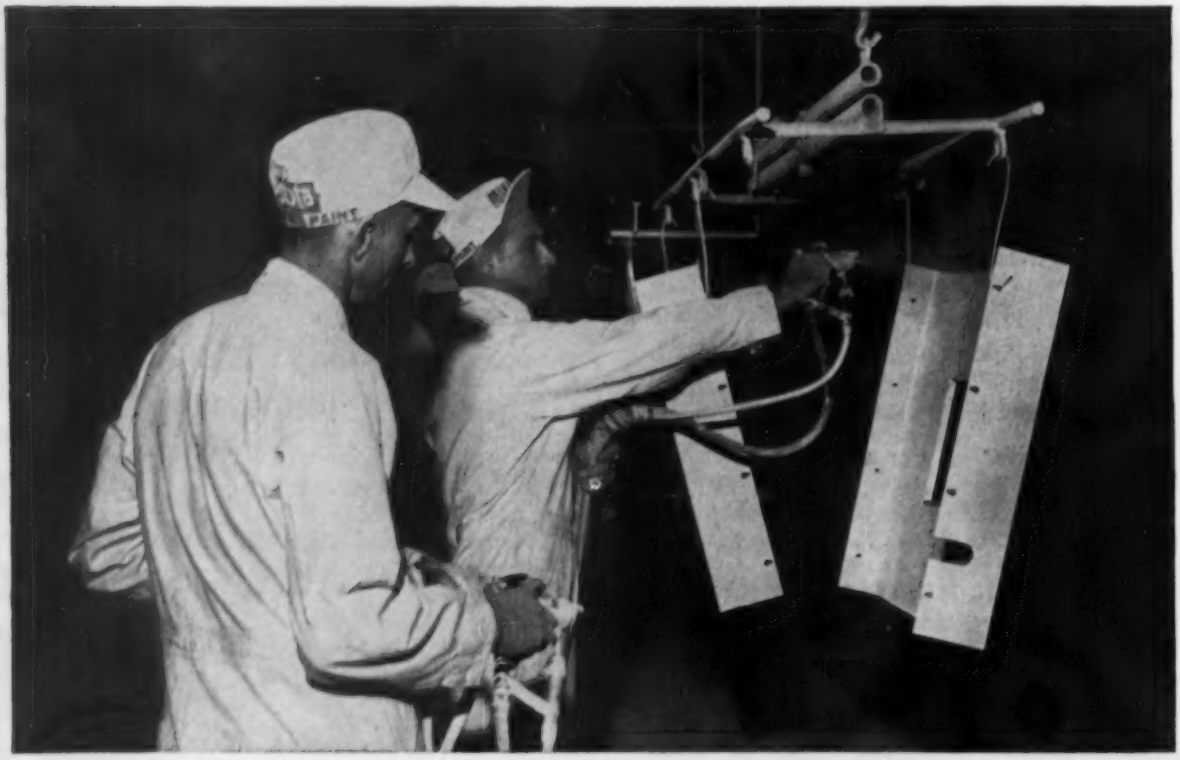
GENERAL REFRACTORIES

FOR THE METALS INDUSTRY . . .

OLIVE HILL
—The world's most renowned blast furnace brick (it is a strong and dense fireclay product)—with superior resistance to slag, load, abrasion, carbon disintegration, and alkali attack.

RITEX—
Unburned basic brick—in magnesite, magnesite-chrome, and chrome-magnesite. More resistant to spalling. Lower porosity, lower thermal conductivity—high hot strength.

STEELKLAD
—A Ritex basic brick, permanently jacketed in a patented steel shell. Just one of many superior GREFCO products.



McCray paint-line operators like the DeVilbiss system because it makes the paint spray the same, cover the same regardless of room temperature or weather conditions.

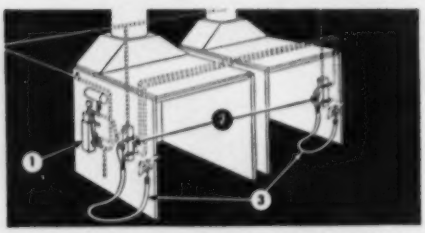
DeVilbiss hot-spray system has cut rejects at McCray Refrigerator Co.

Familiar problem: Rejects had been slowing production and causing costly refinishing at the McCray Refrigerator Company, Kendallville, Indiana. The hot-spray equipment McCray had been using failed to maintain the precise pressure, temperature, and viscosity control necessary in the application of enamel paint.

Cost-saving solution: McCray took its problem to DeVilbiss. The result: DeVilbiss' hot-spray system has cut rejects; reduced air and fluid pressures; and keeps temperature and viscosity constant, providing flawless coverage. Production, now running a full 8-hour day without a break, has increased.

Because of accurate temperature control *right up to the gun*, McCray has realized big savings. Less solvent is used in the paint. What's more, the simple operation of the DeVilbiss system has made the enameling job easier; cut maintenance costs substantially.

What to do: Let a DeVilbiss representative show you how *you* can improve your finishing operations. The standard components of DeVilbiss' paint-heating system can be combined in countless ways . . . to meet your special needs.



DeVilbiss hot-spray system is foolproof; adapts to multiple gun hook-ups. Hot water from master heater (1) heats paint in exchangers (2); heat-jacketed hose assemblies (3) keep paint hot right up to guns, assuring uniform viscosity at all times at each gun.

THE DEVILBISS COMPANY
Toledo, Ohio
Santa Clara, Calif. • Barrie, Ontario
London, England
Branch Offices in Principal Cities

FOR BETTER SERVICE, BUY
DEVILBISS

SPRAY GUNS • AIR COMPRESSORS • HOSE AND HOSE CONNECTIONS • TRANSFORMERS • SPRAY BOOTHS • ACCESSORIES

Hardening:

Method heats die blocks four to five times faster.

A new, gas-fired heating process permits Heppenstall Company's Pittsburgh plant to perform a 20 to 30 hour heating-for-hardening operation on die blocks in but three to four hours, for loads to 20 tons.

Designed and built by Selas Corp. the method employs patterned radiant heat under completely automatic program control to heat die blocks varying in thickness from eight to 24 in. The relatively large sizes of sections involved, plus the inherent crack-sensitivity of die block steels, requires a high degree of uniformity

Automatic control . . .

in heat application. Under conventional heating, uniformity can be obtained by extremely slow heating and long soaking cycles.

Designed for Die Blocks

Specially engineered for die-block heating, the furnace is designed to heat a 38,000 lb work load in only 3 to 4 hour cycles, depending on thickness of work.

In the first five months of this year, 6½ million pounds of die blocks were heated in the unit. Output has been four to five times greater than that from any of 13 adjoining conventional gas-fired furnaces, of the same approximate size, and with 20 pct less fuel consumption per pound of steel treated.

Cam-Operated Program Control

Automatic program control is obtained through the use of cams, cut so as to include the entire heating cycle. Cam shape is determined by the width of the load.

In operation, the cam functions as a remote setting to specify a desired furnace temperature at a particular time. A pneumatic impulse sent to the work-surface temperature controller positions the index. The instrument responds by proportioning the amount of fuel required to meet the work load pattern, whether increasing, decreasing or unchanging.

Blast-Cleaning:

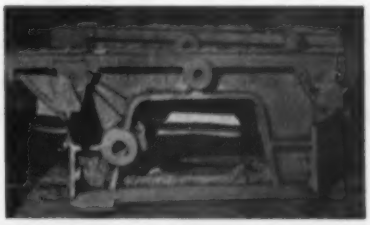
New mineral shot cleans castings better.

A new mineral shot-blast cleaning agent imparts a clean, shiny surface to grey cast iron with lower overall operating cost than with the former agent.

Schneider-Bowman, Inc., Philadelphia producer of iron castings from one to 50,000 lb, used the shot with conventional blast-cleaning equipment and compressed air at 80 psi, and found it improved casting appearance considerably. Shot, made by Baldwin-Hill Co., Trenton, N. J., was non-absorptive and non-corrosive and did not clog air lines or feed worms in blast equipment.

Almost Dustless

Almost dustless, the shot improved operator visibility and



Cleaner casting . . .

comfort and so helped to reduce time required for scale removal. Mechanical stability of the shot has produced a higher recovery and reclamation rate than with the sands formerly used.

Cut Compressed Air Costs!

Cast-iron, *finned inter-coolers on DeVilbiss compressor outfits lower the air temperature between the first and second compression stages, and provide extra cooling. Result: much higher efficiency and greater air output.*

The biggest cost in compressed air is the operating cost. DeVilbiss air compressors save on power, upkeep, and depreciation. By actual tests, DeVilbiss air compressors deliver up to 22.6 percent more air per power dollar. In fact, many times they pay for themselves in power savings alone.

In addition to inter-coolers, every DeVilbiss compressor includes these features: automatic pressure switch, A. S. M. E.-approved tank, check valve manifold, diamond-bored pistons, cylinder head with removable valves, quality electric motor or gas engine.

Contact your local DeVilbiss jobber for a complete analysis of your compressed air needs.

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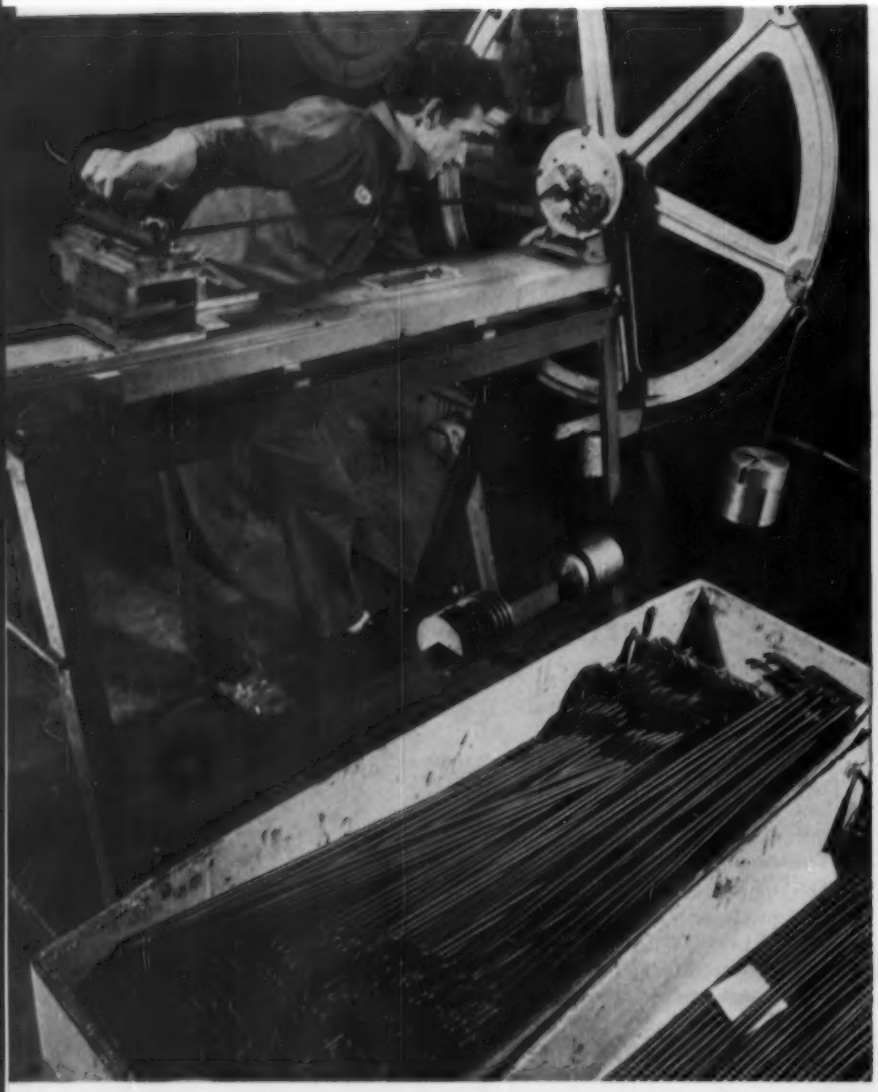

Torque bars, made from high quality oil tempered spring wire, must meet exacting test requirements before they are shipped for installation in automobiles to raise trunk lids.

Selection of wire for torque bars starts with testing for stress-strain characteristics.

Compression springs of .177-inch diameter oil tempered spring wire are individually load tested on Toledo scales for precision accuracy.

Steel Bars With A 400-Pound Kick

How Precision Spring Corporation counts on uniform quality in Pittsburgh Steel's wire to produce millions of springs that do not fail in service.

The hottest new development in steel springs these days is the torque bar.

Already in widespread use as the mechanical storehouse of energy that helps lift the lid on your automobile trunk, you can look for it to start showing up in an increasing variety of applications—in machinery, appliances, and elsewhere.

Key element in the success of the torque bar is its simplicity. Compared to coil springs, it relies less on design and more heavily on the inherent qualities of the steel from which it is made.

The steel quality required is indicated by the fact that a finished torque bar, 43-inches long and weighing only 1¼ pounds, can give your trunk lid an upward flip with a force of nearly 400 inch-pounds. And it can do this year-in and year-out for longer than the useful life of your car.

You can easily see, therefore, how the choice of steel wire for torque bars is an important one. Here's how Precision Spring Corporation of Detroit makes its selection.

The bar for an auto trunk lid is made from .343-inch diameter high

carbon oil tempered spring wire having a tensile strength of approximately 200,000 psi and a yield strength of not less than 150,000 psi. This wire arrives from the mills of expert wire producers such as Pittsburgh Steel Company.

Selected samples are placed in a Tinius-Olsen Super "L" tensile tester. Stress-strain characteristics of the wire—its tensile strength, elastic limit, and yield strength—are electronically charted on a graph.

The correlation of these characteristics shows when the wire begins to take a set. Reduction in area of cross section measured at the break indicates that the wire is not too stiff and brittle for proper forming.

These tests assure Precision Spring that the wire will meet the requirements for torque bars before production starts. Once the wire is in production, Precision counts on consistent uniformity throughout the shipment to provide long trouble-free runs.

In forming the bar, it is given a total of 11 bends. Five of these are 90 degree bends on a radius less than the diameter of the wire. So you can see that this wire must have formability. At the same time, it must retain its springiness.

Finished bars are tested on special equipment. On this particular torque bar, a maximum torque load of between 720 and 900-inch pounds is suspended from the bar for 24 hours. Then the bar is tested for a working torque load of between 320 and 397-inch pounds to make certain it will not take a set or fail in service.

If every bar were tested, however, costs would be prohibitive. Again, Precision must depend on uniformity in the wire it receives from Pittsburgh Steel. The sample selected must give a true indication of the performance that can be expected for all torque bars produced from the wire shipment.

This reliance on uniformity is not confined to production of torque bars alone. Precision Spring specializes in the tough jobs for automotive and other industrial spring users. It makes compression, extension, and torsion springs in an almost infinite variety of designs and sizes—on high-speed equipment geared to turn them out by the millions.

On any production run, variations in uniformity of the wire within a coil or from coil to coil will cause production interruptions. Beyond that, it results in costly inspection procedures to make sure all springs measure up to requirements.

Tension springs produced on this Torrington No. 4 automatic coiler, are made from .207-inch diameter oil tempered spring wire. The operator spot checks a spring for proper tension.

So Precision expects uniformity within the specification range from one end of a coil of wire to the other, and within each shipment of coils. That's what it gets in the spring wire it receives from Pittsburgh Steel Company, as proved by the fact that less than one spring in a million ever fails or breaks in actual field service.

Why not help lower your costs and assure the quality of your wire products by taking advantage of the know-how and modernized wire making facilities at Pittsburgh Steel Company? Its range includes: bright basic wire; low, medium and high carbon wire; all types of annealed wire; ACSR core wire; cold heading wire; oil tempered and MB hard drawn spring wire; and shaped wire.

This is supplemented by the range of fine wire specialties produced on up-to-date facilities of the subsidiary Johnson Steel & Wire Company, including: aircraft cord wire, armature binding wire, wire for brushes, metal stitching, hose reinforcement, stapling wire, bobby pin wire, tire bead wire, rope wire, oil tempered and MB hard drawn spring wire in smaller sizes, and music spring wire right down to sizes as fine as a human hair.

Call our closest district office today for prompt, personal attention that will give you the kind of wire you need, when and where you want it.

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All seven of our modern warehouses are located in principal industrial areas . . . near you. Each one is well-stocked: equipped to fill your alloy steel requirements promptly, whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow". Every warehouse, too, is staffed with experts in metallurgy who are ready to serve you.

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126 Sidney Street, Cambridge 39, Massachusetts

Quality Control

X-ray gage checks tinning operation.

X-ray gages installed on all three electrolytic tinning lines at Jones & Laughlin's Aliquippa, Pa., Works, are measuring amounts of tin being applied to the steel sheet during plating.

Designed and developed by J&L, the gages provide a continuous operating check on tin coating

Gages thickness . . .

thickness rapidly and without injury to the product. They can measure tin coating thickness to within 6/10,000,000 in. An instrument working with the gage permanently records how much tin actually was applied to a particular steel coil.

Beamed X-rays

The new method of measuring tin thickness depends on the phenomenon of X-ray fluorescence. X-rays are beamed at a sheet of tin plate as it leaves the line at speeds of 700 to 2000 fpm. The X-day beam causes the steel underneath the tin coating to fluoresce, giving off X-ray radiation. As the iron fluorescence leaves the steel sheet, it is partially absorbed in the tin coating so that the amount received by a radiation detector will decrease as the tin thickness increases.

The output of the detector can be used to determine the thickness of the tin coating.

Gage Components

Equipment making up the gage includes an X-ray power supply

and tube, a radiation detector, and necessary amplifying, indicating and recording mechanisms. Design features incorporated in the gage overcome mill problems of wide temperature fluctuation, humid air, and mill vibration.

Heretofore a slow, tedious chemical control has been the only method of determining how much tin was being applied to steel on the tinning line at the time of application. The method was costly, since samples had to be punched out of sheets of tin plate for the tests, and could not keep up with increased tin plate production line speeds within the last few years.

Coatings:

Improved method for applying cermets.

A rapid, economical process for applying a chromium-boron-nickel cermet coating to a metal base is now in use at National Bureau of Standards.

Combining the cermet powder with a ceramic frit, the process employs ordinary ceramic coating procedures to replace the former flame-spraying methods; provides hard, high-temperature-resistant facings for metal parts which have excellent thermal shock resistance and reasonable ductility.

Cermets possess properties of both metals and ceramics. The chromium-boron-nickel types, used extensively in recent years as hard facings for metal parts subjected to severe erosion and oxidation, have some degree of ductility, are resistant to thermal shock and oxidation and retain their strength and hardness at high temperatures.

Flame Spraying Limitations

The commonly-used process of flame-spraying the powder, then fusing to the base metal with an oxy-acetylene torch, produces a dense and well-bonded layer but tends to be expensive for large-scale production. Also the flame-spray technique is unsuited to coating cylindrical parts of small

DO YOU NEED ANSWERS TO THESE QUESTIONS?

1 How can I electroclean steel at lower cost?

2 How can I find a brass cleaner that gives better protection against tarnishing?

3 How can I reduce rejects due to faulty electrocleaning of zinc die castings?

***Answer* 1** Following an Oakite recommendation, one plater made a small change in his steel-cleaning cycle and soon had two tankfuls of cleaning solution doing the work of three—and the plate adhesion was improved. *See booklet offered below.*

***Answer* 2** Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current. *See booklet offered below.*

***Answer* 3** Oakite has an anodic conditioner that offers brighter plating of zinc die castings . . . with no anodic blackening and fewer rejects. *See booklet offered below.*

FREE For more information about the electrocleaning of steel, brass or zinc die castings, ask for one or all of the booklets listed in the coupon.

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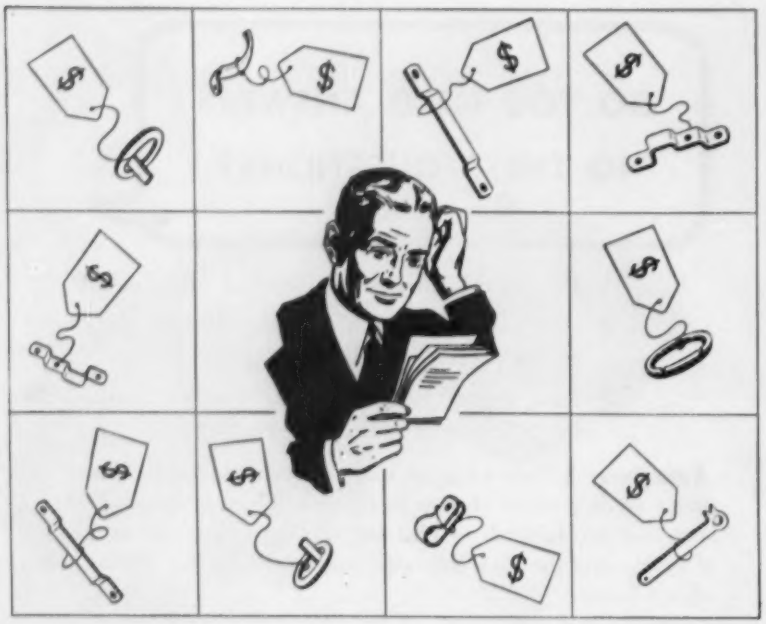

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STAMPINGS DIVISION

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Dipped or sprayed . . .

inside diameter and is not feasible where thin layers—about 0.002 in.—are required.

In the new process, developed to overcome these objections a slip is prepared from a cermet powder and a ceramic frit and applied to the metal part at room temperature by either dipping or spraying.

Fired at High Temperature

The part is then fired at a temperature above the melting point of both the cermet and the frit. During firing the ceramic phase in the coating serves as a flux to permit welding of the cermet particles without the necessity of a highly-purified, oxygen-free atmosphere.

Depending on firing temperature, the ceramic material either "sweats out" to the surface or remains as occlusions in the cermet network, while the cermet particles melt to form a continuous layer that becomes brazed to the surface of the base metal.

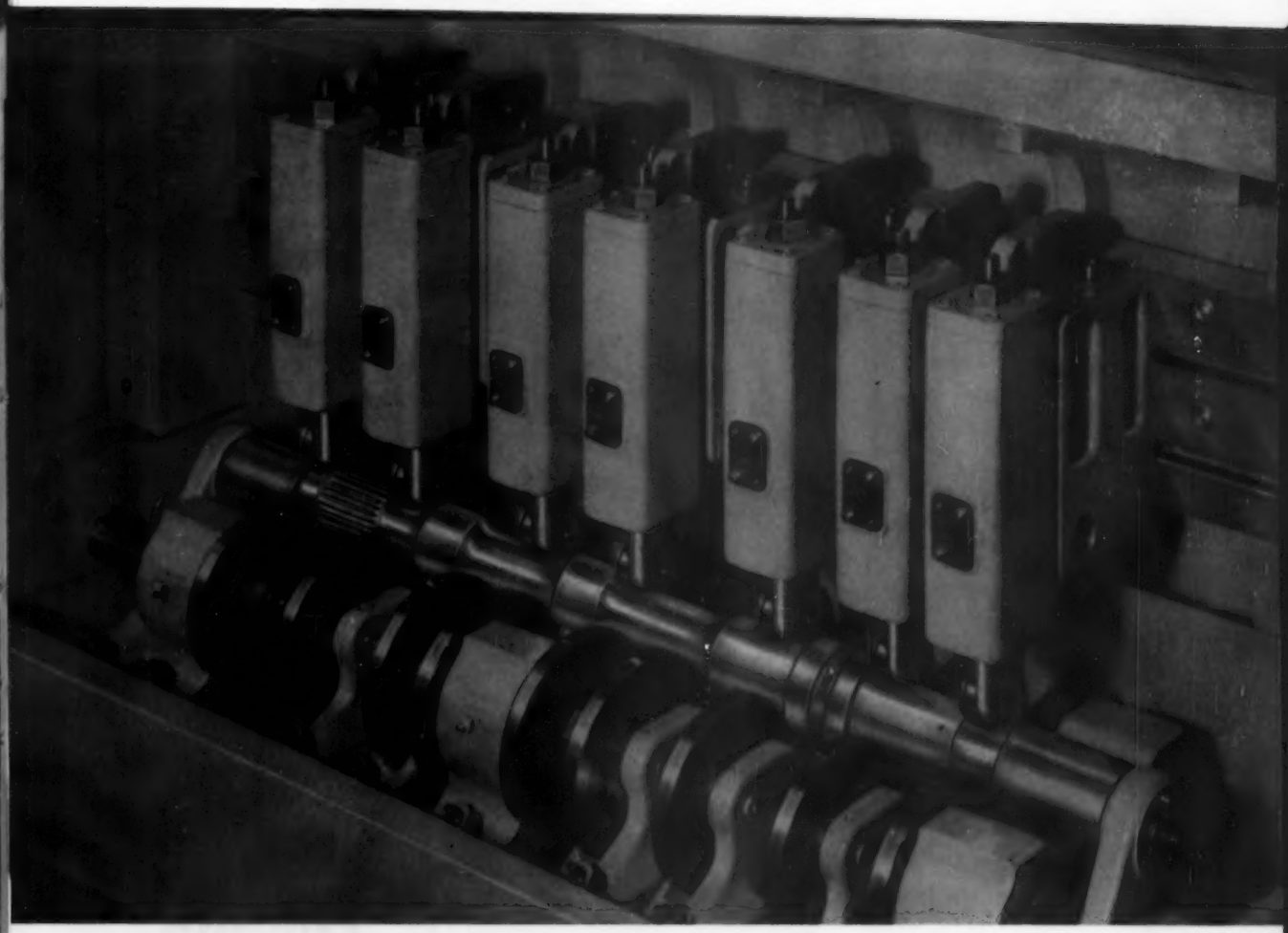
Contacts:

Ventilated distributor points decrease peaking, pitting.

The ventilating feature of a new distributor point may be adaptable to other contacts which must open and close at high speeds.

Now being mass-produced by H. A. Wilson Co., for a major auto manufacturer, the distributor point has a hole punched in the tiny tungsten contact for improved performance and longer life. Points in passenger cars must normally be changed every 5000 to 15,000 miles to avoid serious power loss and gas waste. The new contacts better this by decreasing peaking and pitting, usual causes of distributor malfunction.

In operation, the rapidly vibrating distributor arm pumps air through the holes to reduce the effect of the arc and produce more even metal transfer.



How to eliminate *your* shaft distortion problems

Distortion during hardening is a major production problem.

The Gleason No. 140 Rolling Quench Machine corrects this difficulty, because the quenching and straightening operations are performed at the same time. Because cold straightening is eliminated, valuable production time and expense are saved, and the quenched parts have less residual stress.

Shafts cannot distort because they are rolled under pressure throughout the quenching operation. The operator puts the hot part on the lower rollers and starts the machine. From there on, the quenching operation is automatic. Rolling speed, pressure, and oil flow are pre-set to suit the work that is being quenched.

The automatic quenching cycle saves operator time, and gives *uniform* results for all parts quenched. The pre-set metallurgically correct oil flow gives uniform hardness.

The Gleason No. 140 Rolling Quench Machine is equally suited for small or large quantities. It accommodates shafts $\frac{9}{16}$″ to 4″ in diameter, 6″ to 40″ in length, with integral cams or shoulders up to 8″ diameter. Tooling can be arranged to hold parts on diameters or centers. Unusual shapes can be handled with additional tooling. Write for further information.

The Gleason No. 140 Rolling Quench Machine also handles multiple quenching of short shafts.

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

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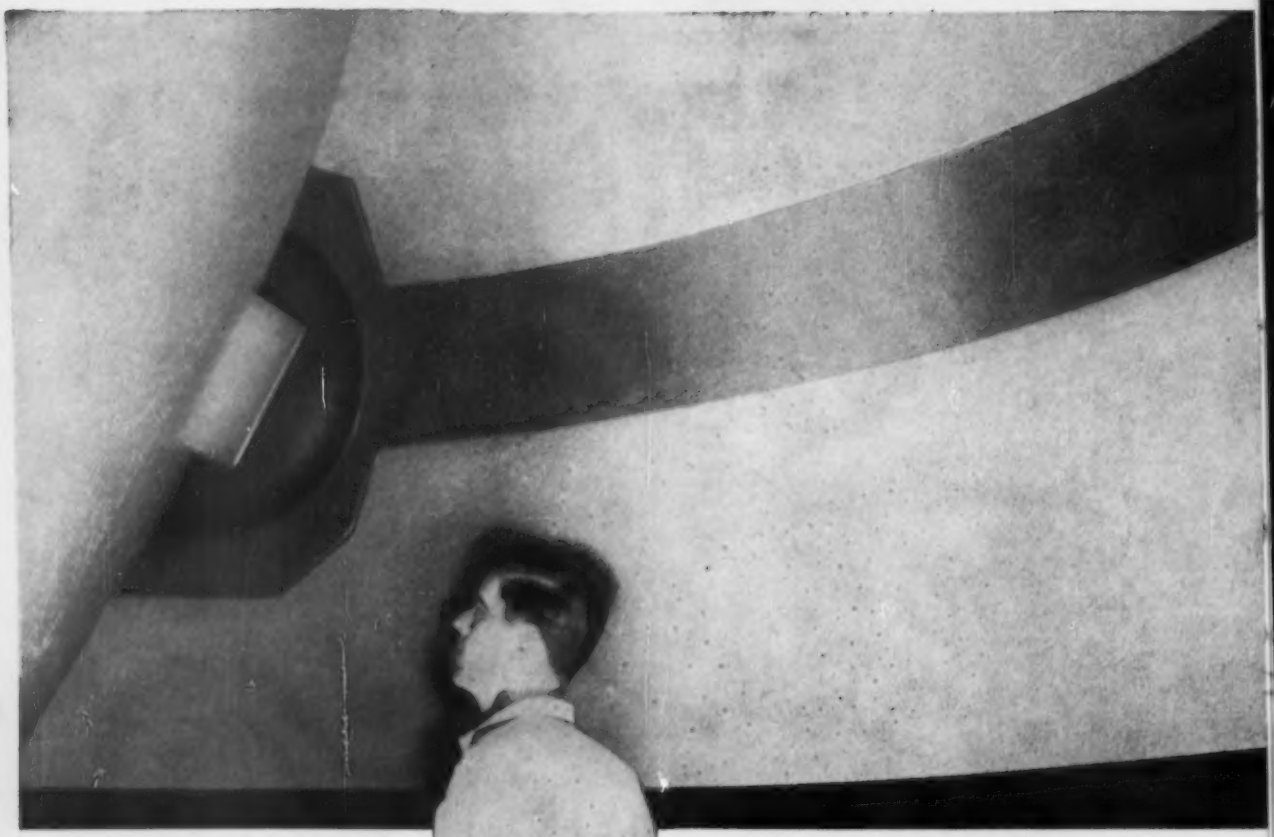
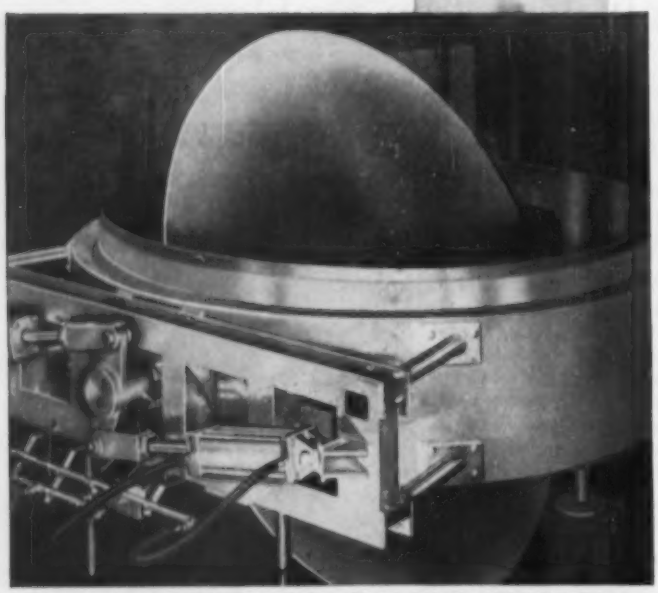




Completed valve is ready for shipment to an Air Force wind tunnel. ENDURO Stainless Steel is used for the seal band which is welded to the inside of the valve body. The manufacturer, Henry Pratt Company, Chicago, also makes a chemical valve fabricated entirely from ENDURO to resist corrosion.

ENDURO... seal in 14-foot

This stressed-seal butterfly valve was made by the Henry Pratt Company, Chicago, for an Air Force wind tunnel. The valve employs an inflatable metal seal band which "inflates" against the disc edge and provides a tight shutoff when pressure is applied. It was designed for operation under static pressure conditions ranging from 0.5 to 50 psia and a temperature range from −10°F. to +250°F.

To meet these operating conditions and to combat corrosion, ENDURO Stainless Steel, Type 301, is used for the seal band. The company prefers ENDURO because of its workability and machinability. Compared to other materials previously used, machining and welding time were cut to

REPUBLIC

World's Widest Range of Standard

provides positive butterfly valve

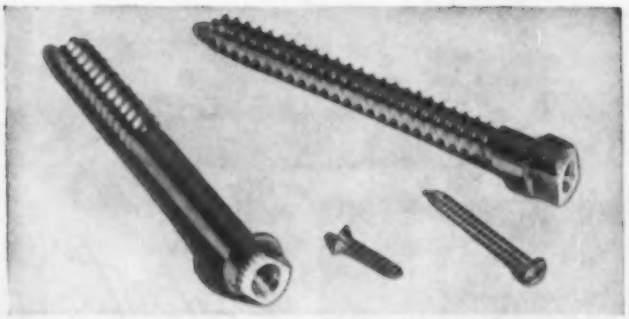
less than half.

Ease of fabrication and stubborn resistance to heat, pressure, corrosion and rust are only some of the features of ENDURO. It provides strength without prohibitive weight and bulk. It's easy to clean. ENDURO is solid stainless steel with no applied surface to chip, crack or peel. It is tough, strong and durable—resists denting and abrasion.

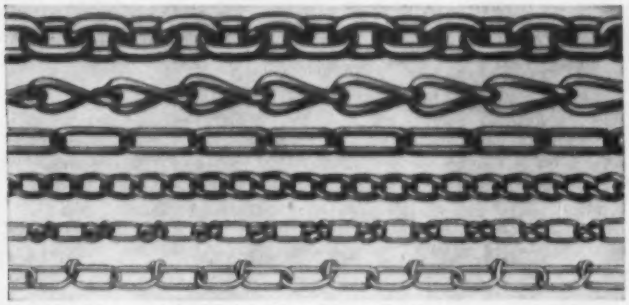
Republic's exclusive "Three-Dimensional Metallurgical Service" is ready to help you apply ENDURO's bonus benefits to your product or process. ENDURO is available through your Republic distributor in many forms—sheets, strip, hot rolled and cold finished bars, wire and tubing.

STEEL

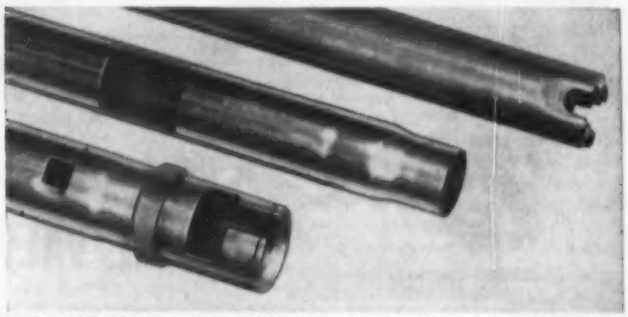
Steels and Steel Products



HERE'S MORE PROOF OF THE MACHINABILITY OF REPUBLIC TITANIUM. These bone screws were made from Republic Titanium Alloy by The Collison Surgical Engineering Co., Baltimore, Md. Machining operations included cutting off, milling, drilling, tapping, threading and buffing. Titanium is used for surgical parts and instruments because it is strong, lightweight and absolutely inert. Republic will help you use all its advantages profitably.



FOR HOISTING, HOLDING, HAULING, TOWING, BUNDLING, you can count on Republic Chain for greatest safety and dependability. Republic's Round Chain Division makes a complete line of welded and weldless chain for every industrial requirement—every type of fitting, attachment and accessory. Strategic location of Republic Chain plants and warehouses assures you of prompt delivery.



YOU CAN SAVE ON TUBULAR PARTS LIKE THESE when Republic does the tube fabricating. Republic's Steel and Tubes Division is equipped to handle all kinds of tough fabricating jobs—has the machinery, the experience and the ability to work out the most economical method of making quality tubular parts. And that includes complete assemblies. Call in Republic to quote when you want to keep fabricating costs down.

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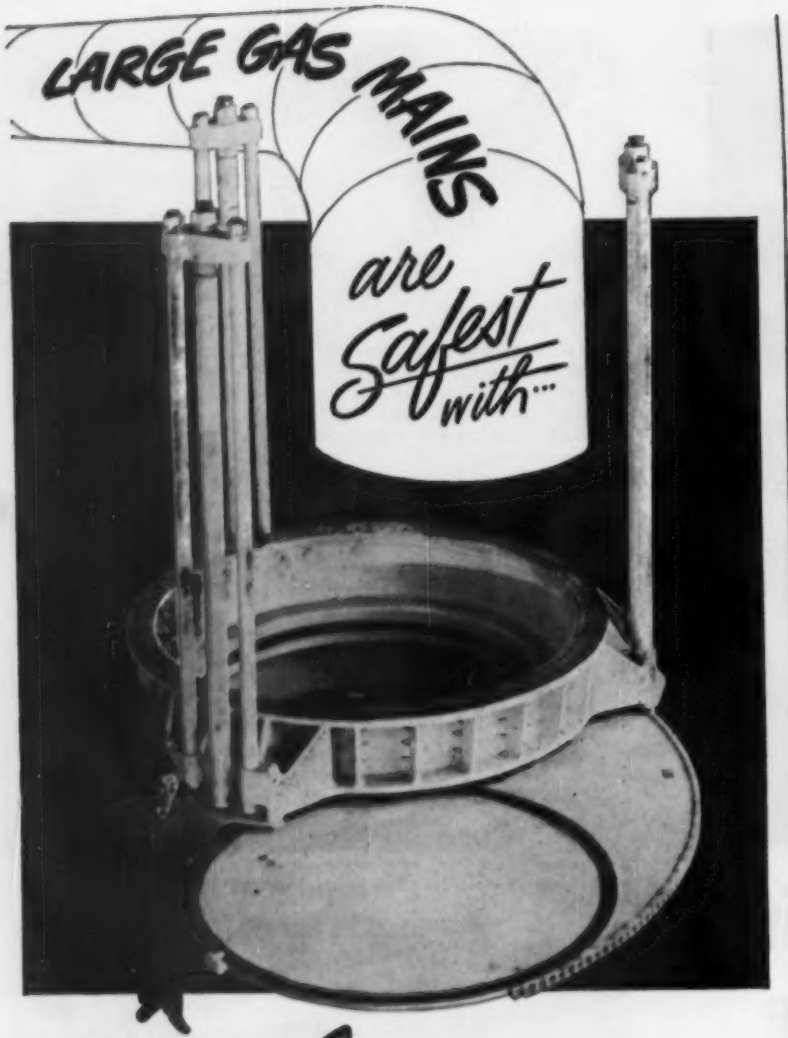
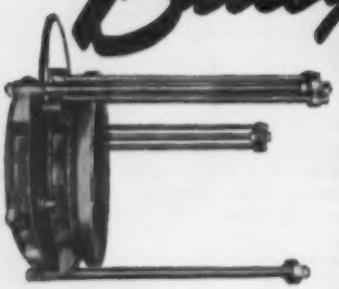


Bailey thermal expansion
GOGGLE VALVES



One of nature's most dependable forces—the linear expansion and contraction of steel—frees and clamps the goggle plate of these valves. Steam applied to three sets of tubes causes expansion which frees the goggle plate for swinging to either open or closed position. When steam is removed, contraction of the tubes forms a tight, safe, leakproof seal. Can be operated by hand in case of steam failure.

Made in sizes from 36" to 120" in diameter for horizontal or vertical gas mains.

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Chemicals:

Halogen fluoride cuts pipe in fraction of second.

The tremendous energy potential bound up in elemental fluorine and the halogen fluorides has been harnessed to cut and perforate steel pipe miles below the earth's surface.

The chemical is contained in a heavy-walled cylinder equipped with a pressurizing chamber and a firing head with appropriately spaced orifices. The assembly, lowered into an oil well from a service truck, is positioned accurately and held against powerful thrusts by specially designed latches. Upon electrical impulse through the electronic panel and conductor cable, the chemical is ejected under pressure against the inner pipe wall, which it penetrates in a fraction of a second.

Cuts Without Flaring

By changing the placing of the openings, the tool makes a clean cut, with none of the objectionable flaring produced by previously used explosive methods. It also perforates a smooth, burrless hole.

Jointly developed by McCullough Tool Co. and Pennsylvania Salt Manufacturing Co. the chemical cutter for 2" and 2½" tubing has been successfully employed during the past year in many commercial operations at depths of a few hundred to many thousand feet. In addition, a chemical-cutter for casing has been developed and halogen fluoride perforating tools have been designed which their developers say show distinct advantages over present bullet and jet perforators.

Metallizing:

Worn valve plugs reclaimed by metallizing process.

The reclamation department at Standard Oil of California's La Habra Plant, handling all repair work for their operation in South California, is reconditioning valves by a metallizing process

COMPLETE *Finishing* SYSTEMS

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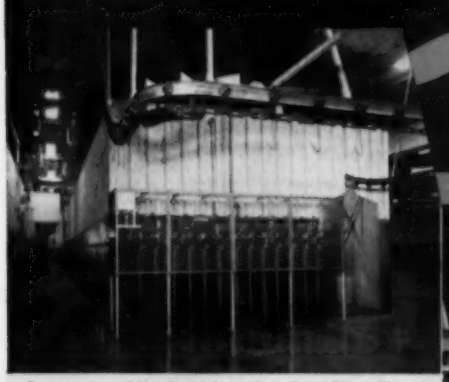
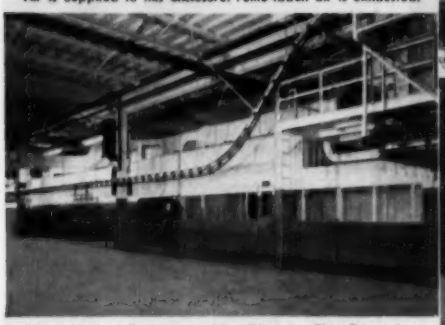


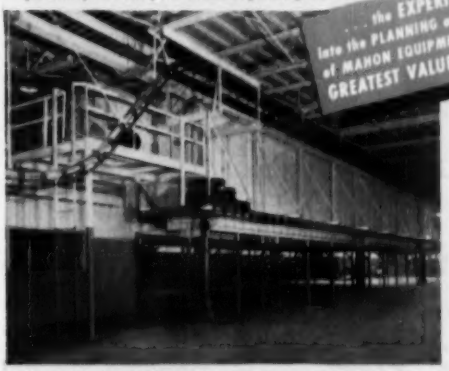
Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.



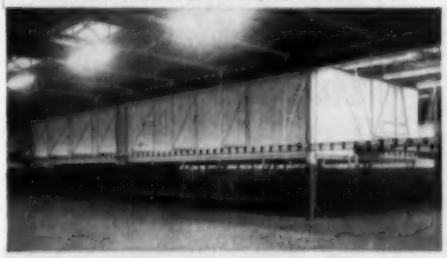
View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.

View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited. This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!



View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.



Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

Black Enamel Parts at CHRYSLER CORPORATION of CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail—automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES ENGINEERING OFFICES in NEW YORK AND CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

Practical Idea for the Production Man

Efficient electric hoists...to move materials overhead and release floor space for more valuable operations.

CM HOISTS

CM LODESTAR ELECTRIC CHAIN HOIST
⅛ to 1 ton capacites—First truly heavy duty version of small electric hoist. ⅛ ton model weighs only 51 lbs. Heavy duty self-adjusting brake. Upper-lower safety limit switches. CM-Alloy load chain.

CM METEOR ELECTRIC WIRE ROPE HOIST
½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

Good Suggestion for the Maintenance Man!

Rugged lightweight hand hoists and pullers...to make your job easier and safer

CM CYCLONE HAND HOIST
⅛ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

CM PULLER THE "ONE MAN GANG"
⅛ to 6 ton capacities—Lifts or pulls at any angle. Lever handle operation. Automatic load brake holds at any point. ¼ ton model weighs only 13 pounds. CM-Alloy flexible load chain.

ALSO... *CM Trolleys and Cranes*

Call the CM distributor for descriptive literature, prices and fast delivery from stock.

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

Metallizing appreciably reduced grinding time...

promising savings over their previous method of thousands of dollars yearly.

Reclaims valve plugs...

Valve repairing comprises the greater part of the reclamation work, and they handle up to 5000 valves yearly for hundreds of installations in the area. Most require reconditioning. Handling water, sand and oil during pumping operations and controlling gasoline, oil, grease and other chemicals in the refineries results in a very rough combination of abrasion and corrosion. Hard stainless steel has given the plugs a much greater life, resisting the corrosive action of the chemicals and proving much tougher in contact with mud and sand pumped up during drilling.

Ten Incher, Two Hours

In an example reported as typical, a 10″ plug was sprayed in two hours, which would have taken a welder two days. Metallizing required very little excess metal for finishing, appreciably reducing grinding time.

Refining:

New ore process promises adequate manganese supplies.

A process for economic treatment of low grade manganiferous ores, developed for Strategic Materials Corp., a Canadian firm, hold great promise of freeing the North American continent from reliance on foreign sources for manganese.

Ninety pct of the manganese ore used in the U. S. and Canada in steel production has had to be imported, mainly from China, more recently from India and Africa. The possibility of economic production from known low grade manganese ores in North America, therefore, has considerable strategic importance.

The process is based on the principle that low grade ores can be economically upgraded in an electric furnace for subsequent treating in an adjoining furnace, in a continuous operation, as high grade manganese slag.

Involves New Concept

This involves an entirely new concept in which the electrode position relative to the slag controls the temperature of the slag, so that little or no manganese is lost through vaporization and the heat of the slag itself is used to smelt additional raw materials.

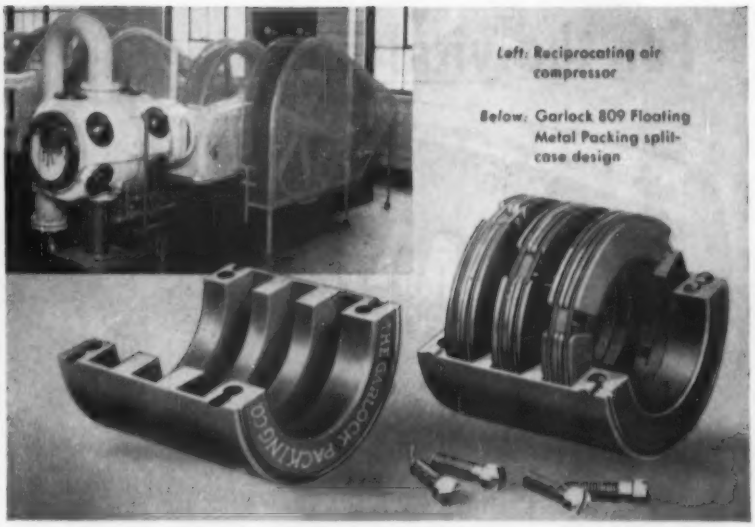
In this way low cost, low grade manganiferous ore can be converted, through benefication and purification, into high grade ore in a first furnace, with the combined cost of ore and treatment up to that point being substantially less than the cost of imported high grade ore. In the continuing operation a second furnace smelts the ore through high carbon ferro-manganese or silico manganese and a third furnace produces medium to low carbon ferro-manganese, as desired.

Fastenings:

New precision, high-torque set screws hold tighter.

A new line of socket-head set screws that can be tightened up to 40 pct tighter and hence have greater holding power than ordinary set screws has been developed by Standard Pressed Steel Co., Jenkintown, Pa.

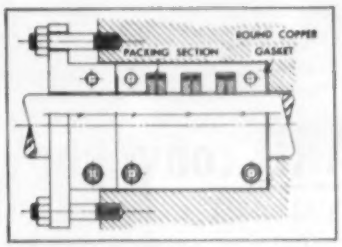
Called precision, high-torque set screws, the new steel fasteners stayed firmly in place as much as 23 times longer than ordinary set screws in tests under extreme



For air compressors, users report

GARLOCK SPLIT-CASE METAL PACKINGS

have 2 big advantages



1. **LONG, TROUBLE-FREE LIFE.** Minimum of 7 years with proper lubrication.

2. **CAN BE INSTALLED *WITHOUT* DISCONNECTING THE ROD.** Downtime is reduced to a minimum.

You can eliminate the cost of frequent packing replacements and unnecessary downtime by installing Garlock split-case metal packings on your reciprocating air compressors. Service reports show that these Garlock metal packings have given 15 years and more of trouble free service with a minimum of rod wear.

For complete information, call your Garlock representative or write today for Brochure 3889.

THE GARLOCK PACKING COMPANY, PALMYRA, N. Y.

Sales Offices and Warehouses: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, Los Angeles, New Orleans, New York City, Palmyra (N.Y.), Philadelphia, Pittsburgh, Portland (Ore.), Salt Lake City, San Francisco, St. Louis, Seattle, Spokane, Tulsa

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK

PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS, RUBBER EXPANSION JOINTS

For the vital links in your

call in STANDARD conveyor

Up-to-the-minute conveyor planning between automatic machines and control points is essential to gain the full benefits of automation. Your needs in conveyors — ranging from engineered systems of power and gravity types to single units — can be met by Standard. Nearly 50 years of "package" conveyor application experience is available to you. Our engineers can choose from roller, belt, slat, chain, wheel, push-bar conveyors, spiral chutes and pneumatic tube systems, plus special portable types.

If you have plans of *any kind* — adding to present facilities or completely modernizing with a new conveyor system — write and tell us what you make or convey. Or call your Standard representative listed in your classified phone book. Send for General Catalog — address Dept. IA-955

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minnesota
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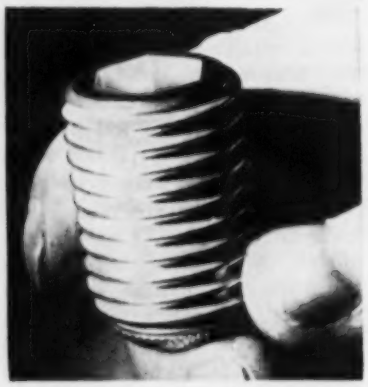
GRAVITY & POWER Conveyors
ROLLER • SLAT • WHEEL
SECTIONAL • BELT • CHAIN • PUSH-BAR
PORTABLE CONVEYOR UNITS:
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR
HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE
PNEUMATIC TUBE SYSTEMS

impact-induced vibration. Better, more uniform fit both of key in socket and of screw in tapped hole, resulting from closer thread and socket tolerances, and greater re-use and wear life resulting from new atmosphere-controlled heat treating techniques that provide an optimum balance of screw strength and hardness are other advantages claimed.

Principal Advances

Principal high-torque set screw advances, some field tested in previous fasteners for several years, include:

• Fully formed, precision threads —on all screw sizes and lengths—



Tighter holding . . .

that are stronger and more uniform than cut or ground threads.

• Deeper sockets, up to 50 pct deeper in some sizes than other screws, that provide greater wear area and more surface contact with the wrenching key.

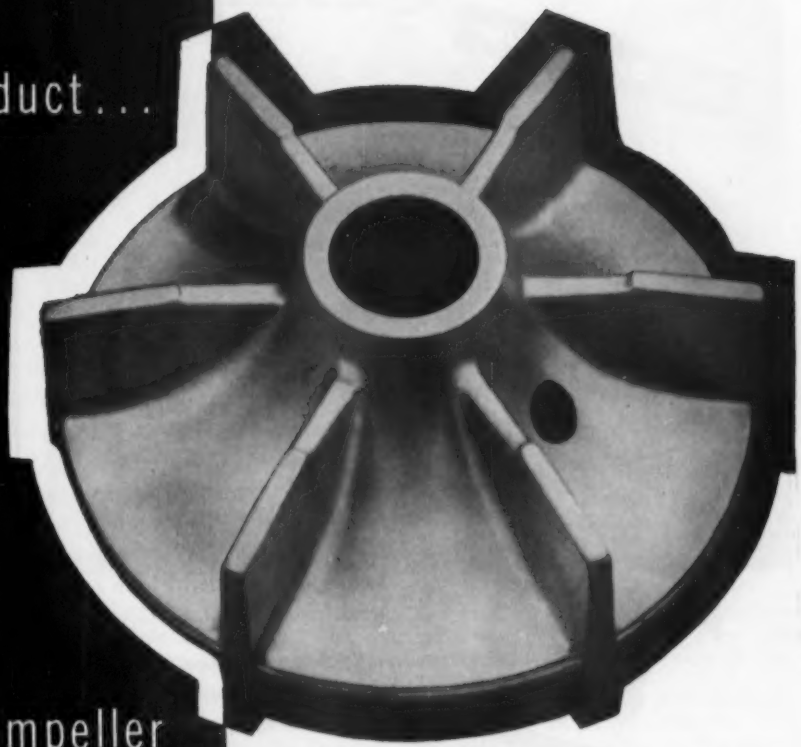
• Stress-relieving fillets at socket corners that strengthen the socket wall, permit tighter wrenching without danger of cracking the screw.

• Harder socket walls that prevent reaming of the socket by the key even under the unusually high recommended tightening torques.

• Reduced tolerances, as close as 0.0005 inch, between socket and mating key.

• Harder, tougher self-locking knurled cup point, available on all but the smallest sizes, that prevents the screw from starting to come loose when once tightened.

another case where
MUELLER BRASS CO.
FORGINGS
improve a product...



diesel engine
water pump impeller
forged of "603" **HIGH STRENGTH BRONZE**

Formerly produced as sand castings, these impellers now give better results because they're forged from "603" high strength bronze by the Mueller Brass Co. Said to be "right for the job and far superior to the old cast impellers", these forgings bring greater efficiency and longer life to the diesel engine water pumps in which they are installed. This tough "600" series alloy is readily forgeable, possesses remarkable resistance to corrosion, and has fine bearing qualities. Uniformity is excellent, due to the closer dimensional control of the forging process, and surface finish is noticeably smoother. This is another case where Mueller Brass Co. forgings have greatly improved a product . . . why not let our engineers show you the many advantages of using forgings.

MUELLER BRASS CO.
STREAMLINE PRODUCTS

MUELLER BRASS CO.

PORT HURON 24, MICHIGAN

35% NICKEL

DURALOY

15% CHROMIUM

Furnace Castings

Here are two good examples of our work in high-nickel castings!

Heat Treating

These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

Carburizing

Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

If you would care to have our metallurgist study your casting problem, we shall be glad to have you call upon us for the service.

Our New General Catalog is yours for the asking.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

CHICAGO OFFICE: 332 South Michigan Avenue

Handling:

Vibration, gravity keep tiny magnets moving.

Vibratory hoppers and miniature gravity conveyors are moving more than 40,000 tiny rod magnets daily through some 20 handling and manufacturing operations, under the watchful eyes of only three operators.

Keeps 'em moving . . .

Four Main Steps

Four main manufacturing procedures are involved in the production sequence at the Edmore, Mich., plant of the G.E.'s Carboloy Dept. —two grinding operations, heat treating and final mechanical and magnetic testing. Such other functions as sorting and rejecting, conveying and positioning between the main operations are almost fully automated.

Hoppers Take Over

Hoppers take over almost immediately after foundry breakout to line up magnets, discard unacceptable ones and feed the rest, single file, to the first grinder. After grinding magnets drop into trays which are emptied into a large rotating hopper. This again sorts and passes on acceptably-sized magnets to trays which are emptied into a third hopper feeding the second grinder. Again, magnets are vibrated end-to-end for feeding.

Vibratory device loads them in containers for heat-treating . . .

Magnets emerge from second grinding to automatically drop into tote boxes. These are transported by lift truck to a vibratory boat-loading device, which lines them up in the containers used to carry them through the heat treating furnace.

Ready for Testing

Magnets leave the furnace via conveyor, are cooled, then carried to the next station for mechanical and magnetic testing.

Rolling:

Cold-rolling fillets lengthens roll life.

Cold-rolling fillets in the manufacture of cast steel back-up rolls may be an answer to longer back-up roll life.

The Rolls Div. of Blaw-Knox Co., Pittsburgh, says fatigue failure at the fillet, between the neck and

Strengthens roll fillet . . .

roll body, is one of the commonest causes for back-up roll failure. Cold-rolling fillets to increase their tensile strength where stress concentration is greatest proportionately increases the fatigue limit, which is approximately one-half of tensile strength. Cold rolling may also impart a compressive stress, which acts in a direction to minimize fatigue stresses.

The cold rolling impaction tool itself is comparatively simple, con-

OUR ERIE STRAYER BUCKETS WORK LONG HOURS, NEED LITTLE SERVICE

Reports Max Dozoretz, Partner, Lancaster Iron and Metal Co.

Clamshell buckets are put to many tough jobs. Probably the toughest is handling scrap metal. The constant brush of steel against steel lays up the ordinary bucket for frequent repairs and soon wears it out.

But not an Erie Strayer bucket! Mr. Dozoretz knows Erie Buckets. He has two of them on the job constantly. He says, "We work our Erie buckets hard—eight to ten hours a day, six days a week. We know they'll deliver full payloads with every pass.

"And we lose no time for maintenance! Our first Erie bucket has been in service, continuously, for six years now and is still going strong."

Compare the Erie with any other clamshell. You'll quickly note its finer engineering and the rugged construction that has made it the bucket preferred by experienced operators everywhere.

These Erie Features Mean More Days of More Work

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

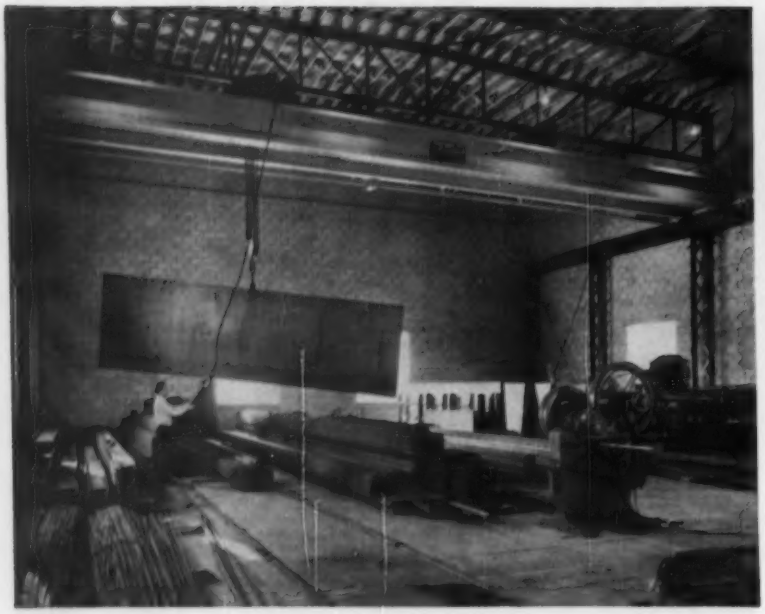
ERIE BUCKETS THE WORLD OVER

For catalogs, write Dept. A95, CABLE ADDRESS: EXIMPORT

ERIE STRAYER CO.

595 GEIST ROAD • ERIE, PENNSYLVANIA

Vanadium-Alloys Steel Company



YOU SAVE THREE WAYS WITH A CRANE LIKE THIS!

Series "D" 'Load Lifter' All-Electric Cranes surpass average industrial needs, but cost far less than other makes for the same service. The second saving results from the permanent efficiency and economy 'Load Lifter' Cranes put into every load handling operation. Third, these rugged cranes require only minimum maintenance.

Invest in a Series "D" 'Load Lifter' Crane and you get the benefits of standardization and mass production — plus advantages first made famous on "Shaw-Box" Heavy-Duty Cranes. The *three-girder* bridge doesn't whip or skew. Bridge and trolley wheels are fixed on axles that rotate on antifriction bearings. Motor and drive shaft are permanently aligned. All gearing operates in oil in sealed housings. Accurate spotting is made easy by variable-speed magnetic control, operated by push buttons on floor controlled cranes, and by master switches on cage controlled cranes. Man, load and crane are safeguarded by protective devices.

If you are looking for dependable, economical crane service in the 1 to 20 ton range, write for Series "D" 'Load Lifter' Crane Catalog 221. From it you can easily select one of the three basic types and three trolley styles in the capacity you need.

'Load Lifter' CRANES

MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

sisting of a wheel, positioning apparatus and gage to register the amount of pressure applied to the metal being rolled.

While tensile strength can be increased by changing the chemical analysis of the roll material, two objections are price and lack of toughness. To get this hardness in the fillet the cost of the alloy metals used would be prohibitive and the end product would have insufficient toughness and ductility.

Hardfacing:

Alloy provides low-cost impact, abrasion resistance

A new low-cost, low hydrogen hardfacing alloy is intended for heavy-duty equipment applications where impact and wear resistance are required.

The new iron base chrome-molybdenum-silicon alloy, produced by Wall Colmonoy Corp., Detroit, is for general purpose hardfacing application to manganese and other steels in the form of ac-dc electrodes.

Recommended Uses

The electrodes are of special value in extending life of such earth-moving and handling equipment components as tractor treads, dipper teeth, ditcher teeth, muller tires, scraper knives, truck beds, rasp bars, dragline buckets, scraper blades, snow plow blades, driving spindles, shovel boom sockets, car couplers, pinnion wobblers and asphalt mill liners.

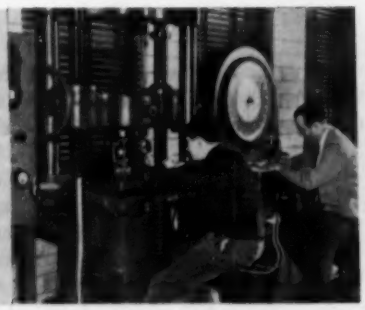
The alloy provides high abrasion and impact resistance and excellent weldability. Spatter loss is low and fluidity good. The product is not recommended for applications requiring heavy build-up where crack-free deposits are demanded.

Hardness, Tensile Strength

As deposited, the alloy has a hardness of 50 to 55 Rc following the first pass and 55 to 60 Rc after the second pass. Tensile strength is about 75,000 psi. Specific gravity is 7.6.

Vanadium-Alloys Steel Company

• advanced research

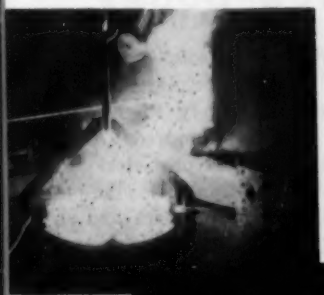


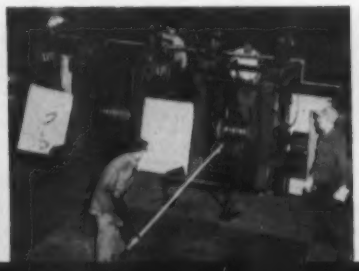
the facts behind

first quality

in tool steels—*and in service!*

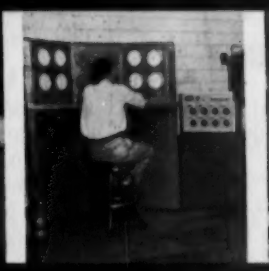
Pictured here are some of the tangibles that assure First Quality in Vanadium-Alloys Steel Company products. Above these modern facilities, however, is the calibre of the men who operate them—men whose experience, in many cases, is as old as the Company—and men in every case whose talents are devoted solely to the production of fine Tool Steel *and nothing less.* Visit us, and see for yourself. We welcome every opportunity to serve you.





• careful melting
• thorough forging
• accurate rolling

complete inspection



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VANADIUM-ALLOYS STEEL COMPANY

Manufacturers of First Quality Tool and Die Steels

Latrobe, Pennsylvania

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

In Canada: Vanadium-Alloys Steel Canada Limited, London, Ontario

Metals:

Super-thin strip for de-icing system.

Beryllium copper strip rolled to the unprecedented tolerance of ±0.0001-in. at a thickness of 0.001-in. is now an essential element of the ice-detection control system used in aircraft.

Produced by the American Silver Co., Flushing, N. Y., a leading maker of high precision tolerance and ultra thin gage metal strip, the beryllium copper strip forms a pressure-sensitive diaphragm in the ice-detection control system. Minute variations in pressure on this strip are transmitted as danger signals through electronic circuits.

Uniformity, Temper Vital

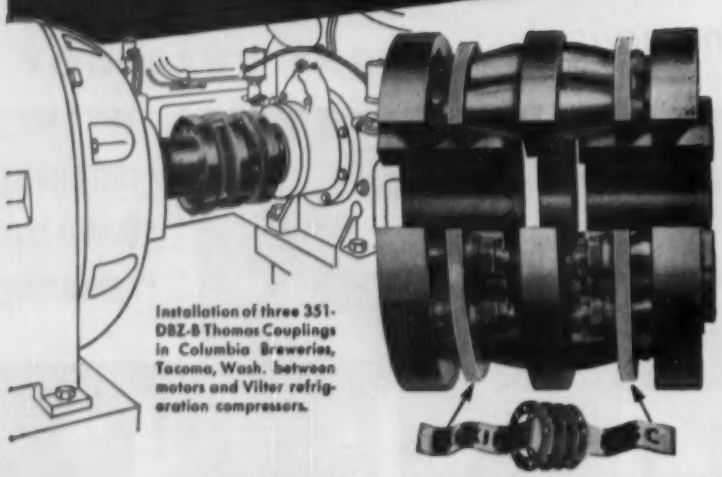
Uniformity and temper of the beryllium copper diaphragm over its entire thickness are of major importance in the de-icing device. These were obtained by the use of a specially designed 12-high Sendzimir mill equipped with electronic controls.

Beryllium copper is an excellent material for diaphragms. It is non-magnetic and possesses an unusual combination of properties, including extremely high strength, long life, high electrical conductivity and excellent corrosion resistance.

Thin as 0.0005-in.

The beryllium copper strip is rolled to thicknesses as low as 0.0005-in. and tolerances of ±0.0001-in. in widths from 3/32 to 6 inches. A recently-perfected pickling process, moreover, guarantees a strip that is oxide-free, eliminating a long-standing fabrication problem.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

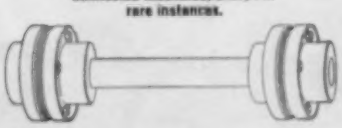


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN. PENNSYLVANIA, U.S.A.

New Books:

"Die Design Handbook," edited by F. W. Wilson, Technical Director, American Society of Tool Engineers. Includes hundreds of actual designs for cold pressworking, representing successful practice of many ASTE members and hundreds of other die-making and using interests. McGraw-Hill Book Co., 330 West 42nd St., New York 36. $14.50. 768 p.

"Chemical Engineering Cost Estimation," by R. S. Aries and R. D. Newton. Helps the technical man to evaluate the business and economic aspects of a project proposal. McGraw-Hill Book Co., 330 West 42nd St., New York 36. $6.00. 255 p.

"Nickel Austenitic Ductile Irons," by F. G. Sefing. Paper describes new engineering material that combines strength and ductility of ductile cast iron with the resistance to corrosion, heat and metal-to-metal wear possessed by conventional nickel-chromium alloy cast irons. Summarizes application possibilities. International Nickel Co., Inc., 67 Wall St., New York 5. Four pages.

"Current Practice in the Development of Management Personnel,"

by J. C. Sinnigen. Describes management development techniques most frequently used by 460 companies participating in the study, examines some current practices, suggests how to get the most from development and training programs. American Management Association, 330 West 42nd St., New York 36. $1.75 AMA members $1.25. 35 p.

"Controls and Techniques for Better Management." Collection of papers presented at the AMA General Management Conference held in Los Angeles. American Management Association, 330 West 42nd St., New York 36. $1.75, AMA members $1.00. 64 p.

"Industrial Furnaces, Vol. II," by W. Trinks. New third edition discusses everything needed to operate industrial furnaces in the most effective and least costly manner. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $10.00. 358 p.

"Principles of Industrial Waste Treatment," by C. F. Gurnham. Sources, pollutional effects and methods for treatment and disposal of liquid wastes produced by industry. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $9.50. 399 p.

"Guides to Strengthening the Sales Effort." How outside management consultants, advertising agencies, etc., may be useful to the sales manager. Other sales management problems. American Management Association, 330 West 42nd St., New York 36. $1.75, AMA members $1.00. 63 p.

"How to Organize and Operate Photographic Service Departments," Eastman Kodak Co., Rochester 4, N. Y. $.50. 60 p.

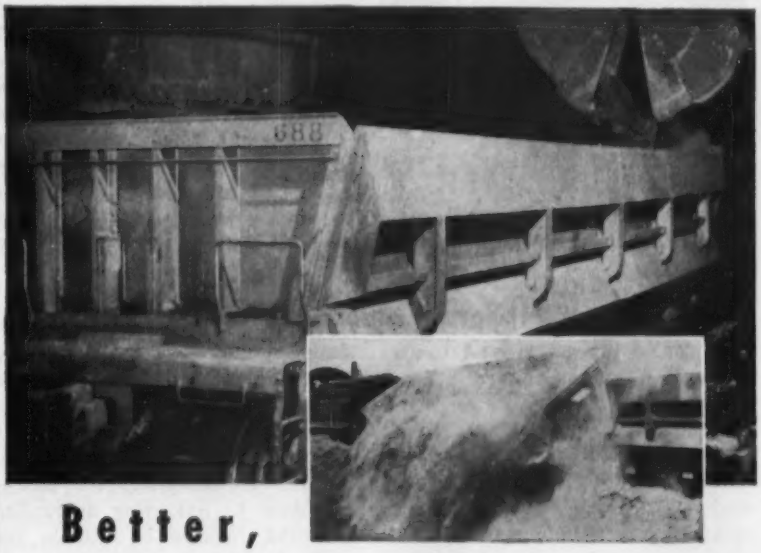
"Electronics in Business." Annotated bibliography lists writings, speeches, visual presentations available. Controllership Foundation, Inc., 2 Park Ave., N. Y. 16. $2.00, $1.50 to Controller Institute members. 174 p.

"The Supervisor's Job Today," by H. T. Lintott, Paper prepared as a primer for supervisors and foremen on the basic management functions expected of supervisory people. California Personnel Management Assn., 2180 Milvia St., Berkeley 4. $1.00.

"Selfwelding, A Method for Making Home Projects in Metal," by L. H. Houck. Lincoln Electric Co., Cleveland 17. $1.00. 128 p.

"Studies in the Behavior of Certain Nonferrous Metals at Low Temperatures." Office of Technical Services, U. S. Dept. of Commerce, Wash. 25, D. C. $4.00. 157 p.

"Broadening the Sales Department's Role." What four company presidents expect from sales management. American Management Association, 330 West 42nd St., New York 36. $1.75, AMA members $1.00. 32 p.



Better, More Economical . . . via DIFFERENTIAL

The yawning bucket drops a huge chunk of waste into this Differential Air Dump Car. Next time the "Sunday Punch" may be tons of reddish hot slag.

For day in, day out service under the rigors of steel mill loading practice, these Differentials perform to the point where steel mills are buying more and more every year.

Unusually rugged design and construction, plus heat resistant floors, when indicated, are part of the answer. Out at the dump it's a matter of seconds to unload completely anything that can be loaded — dumping to **either** side. It all adds up to better, more economical transportation **via Differential.**

Send for detailed specifications!

DIFFERENTIAL PRODUCTS INCLUDE: Air Dump Cars, Charging Box Cars, Ingot Mold Cars; Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

DIFFERENTIAL STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915—PIONEERS IN HAULAGE EQUIPMENT

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 89 or 90

Automation system processes armature cores

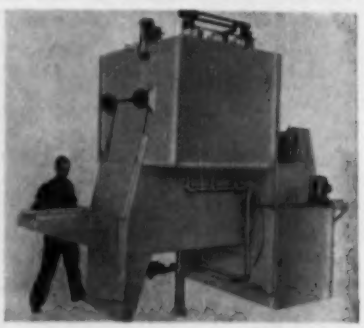
Converting raw armatures, paper and wire into completely wound armatures without operator attention is possible with the Globe armature automation system. Cores from the stacking machine enter to the first stage where insulating paper is formed and inserted into the slots; the insulated core progresses to one or the other of 2 armature winding machines. In approaching the winders, cores roll down a steep track under control. At each of the winders the core is automatically chucked, wound, withdrawn, cut free and deposited by short extension conveyor to the plant conveyor system. *Globe Tool & Engineering Co.*

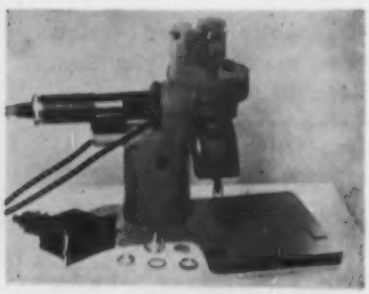
For more data circle No. 37 on postcard, p. 89.

Controlled atmosphere furnace is automatic

New forced convection heat treating unit is a semi-automatic controlled atmosphere furnace embodying a bottom charging design. Furnace and quench chambers are never open to room atmosphere during operation. This assures maximum uniformity of results, minimum distortion, and bright, scale-free finish. Pushbutton controlled and pneumatic powered, the design permits quick change-over from one heat treating process to any other. Handling procedures are streamlined and operating costs are minimized because timing and transfer are automatic from charging door to unloading door. The gas-fired furnace is suitable for hardening, carburizing, carbonitriding, etc. *Denver Fire Clay Co.*

For more data circle No. 38 on postcard, p. 89.





X-ray beam strikes specimens from the bottom

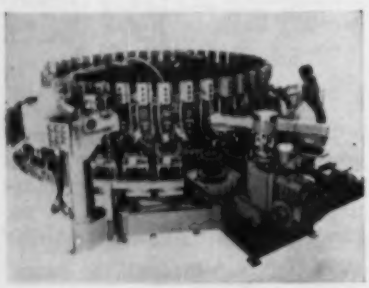
A three-specimen inverted spectrograph is designed so the X-ray beam strikes specimens from the bottom, for analysis of metals, powders and liquids such as heavy waxes and oils. The specimen holders measuring 1⅜ in. diam x 1⅜ in. deep fit into a horizontal disk that rotates inside a leaded-bronze ray-proof housing. An indexing device centers each specimen when over the beam and shows whether it is No. 1, 2 or 3. Accessories available include a synchronous motor for rotating the specimen approximately 78 rpm. *North American Philips Co., Inc.*

For more data circle No. 39 on postcard, p. 89.

Loader and index mechanism combined in single unit

By providing a geared power takeoff on Hautau's standard swinging arm machine loader, a single unit has been created that can load, unload and index a dial table. The combined unit was first developed to unload and rotate a table 16 in. in diam and weighing over 15 tons. The mechanism indexes the 42 station table in 2 sec and at the same time unloads a finished part from the table to an outgoing conveyor. The model floor mounts on a heavy steel base that requires a space of 2½ x 3 ft. *Hautau Engineering Co.*

For more data circle No. 40 on postcard, p. 89.

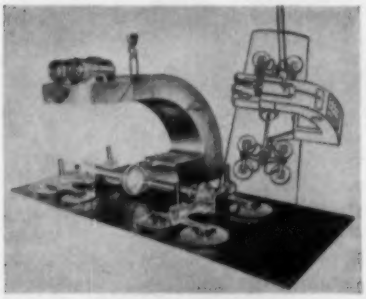


Ram type miller features quill adjustable cutterhead

The quill adjustable cutterhead on the new No. 16S ram type miller permits horizontal, angular and vertical milling plus boring and drilling on one machine without attachments. New from top to bottom, it is designed and engineered for maximum rigidity, cutability and accuracy; offers opportunities to increase production and reduce costs in tool room, machine shop, pattern shop and on the production line. Cutterhead has a 4-in. quill travel; quill power feeds of 0.005, 0.003 and 0.006; 8 spindle speeds from 110 to 3600 rpm. Power table travel is 22 in.; hand cross feed, 10 in.; hand vertical feed 22 in.; ram movement in and out over column 20½ in. *Van Norman Co.*

For more data circle No. 41 on postcard, p. 89.

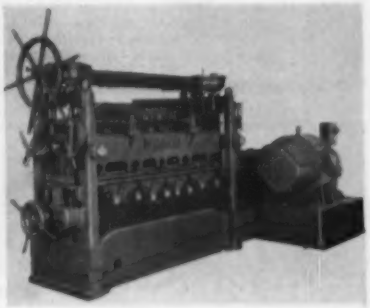
Vacuum sheet lifter has 14,000 lb capacity



Sheets of any nonporous material up to 5 ft wide x 20 ft long weighing 2000 lb can be handled safely by a new 8-cup vacuum roll-over sheet lifter, with a 7 to 1 safety factor. Lifting of the sheets is accomplished by vacuum produced by two pumps. The vacuum is conveyed by tubes through a storage tank to the 8 rubber cups. A special feature is the lifter's ability to rotate the sheet 180°. The lifter is equipped with a U-hook for attaching to an overhead crane. Sheets may be moved to any location in the plant with complete safety. *F. J. Littell Machine Co.*

For more data circle No. 42 on postcard, p. 89.

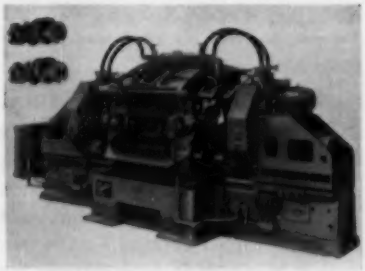
Double-tilt levelers flatten sheet stock



High quality precision flattening of sheet stock of any metal in any gage is possible with a line of double-tilt levelers. Various sizes are available with 13, 17 or 23 rolls. Design incorporates a double-tilt roll principle in which the position of the rolls permits a greater area of contact with the work than on single-tilt levelers. The Sutton-Maust 72-in. double-tilt backed-up roller leveler is for straightening aluminum and steel sheets from 0.020 to 0.069 in. thick up to 60 in. wide. Powered by a 20/25 hp, 230 v, 450/1800 rpm, adjustable speed, dc motor, it operates at speeds of 30 to 240 fpm. *Sutton Engineering Co.*

For more data circle No. 43 on postcard, p. 89.

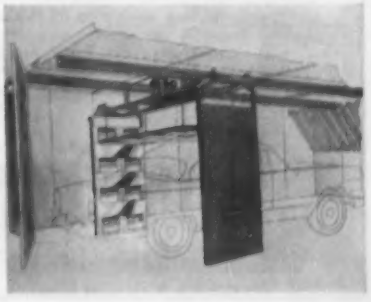
Thirty-four operations on 70 crankshafts per hour



This 2-way Buhr Economatic performs 30 operations from the left-hand side and four from the right, on Plymouth engine crankshafts. It features Powerflo indexing, power clamping of fixtures by means of a power wrench with torque control, multiple heads of master-gear-box construction with individual cluster heads. Bushing plates register into fixtures at each station. All parts are held to tolerances and are completely interchangeable. Each component assembly is located by precision-bored dowels. *Buhr Machine Tool Co.*

For more data circle No. 44 on postcard, p. 89.

Infrared oven reduces drying time by 70 pct



A compact infrared paint drying system for auto and truck bodies utilizes tubular quartz lamps with special polished aluminum reflectors which eliminate dead spots and give 100 pct coverage. Mounted in special ceramic heat insulators to protect electrical connections, the 1000 w lamps with a life in excess of 5000 hr have individual low or high heat controls for localized drying. The unit consists of 2 vertical lamp banks and a horizontal lamp bank for drying tops, hoods, decks, etc. All are suspended from an overhead tram which traverses the length of the vehicle to be dried. *M & E Mfg. Co.*

For more data circle No. 45 on postcard, p. 89.

Turn Page

Silex Selects . . .

Hendrick Perforated Metal

for its new Coffee-Casserole Warmer

When the Silex Company decided to market a new two-unit candle warmer, they chose Hendrick Perforated Metal for the basic fabricating material. For Hendrick Perforated Metal not only helps increase a product's overall attractiveness, but it increases saleability as well. Select from hundreds of attractive designs in commercially rolled metals and gauges to suit your more exacting requirements.

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By specifying MicroRold Type 430 stainless steel for suitable applications, stainless steel buyers can take advantage of the 7¼¢ per pound difference in price between Type 430 and Type 302 stainless. A saving of $155 per ton merits consideration. Type 430 is a straight chromium-stainless with a nominal composition of 17% Chromium. During the Korean conflict, Type 430 was used extensively, due to government restriction on nickel-bearing stainless.

WIDE USE FOR TYPE 430

While Type 430 does not possess the same degree of corrosion resistance as Type 302, it has proven very satisfactory in a wide range of mild corrosion applications, both interior and exterior. It lends itself to a multitude of decorative and functional uses combining all the advantages and qualities of stainless steel—beauty, strength, corrosion resistance, long life, workability and ease of maintenance. Considering the price advantage, with no sacrifice in quality when applied properly, stainless steel buyers will find MicroRold Type 430 a worthwhile material for an impressive number of stainless steel applications.

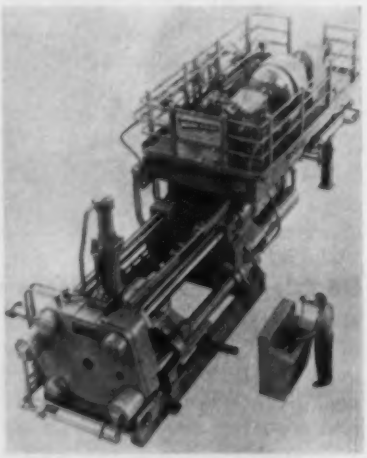
Washington Steel

Corporation

WASHINGTON PENNSYLVANIA

Aluminum extrusion press

A new 1700-ton long stroke oil hydraulic aluminum extrusion press will accommodate billets up to 27 in. long. Press is arranged for automatic and single cycle push-button control from a pulpit type control station. Pumping system is mounted directly over the main hydraulic cylinder. Pumping unit is directly driven by a 900 rpm electric motor. All motions of the press are hydraulically operated. The press is arranged for automatic single cycle control incorporating a selector switch for automatic or manual operation. Operating speeds are advance 600 ipm; extrusion 35.5 ipm; and return 300 ipm. *Watson-Stillman Co.*



For more data circle No. 46 on postcard, p. 89.

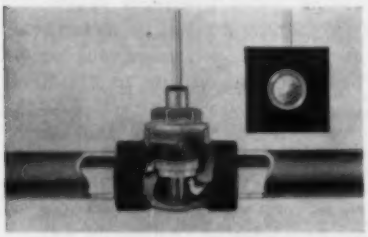
Cold cleaning compound

Metal parts can be efficiently cold cleaned before inspection, storing or further processing through the use of a specially formulated cleanser. Called International Compound No. 504, it is primarily intended for use diluted with water in pressure spray power washing machines. A concentrated liquid mixture of detergents, wetting agents, high solvency power naphthas and solvents, rust inhibitors and emulsifiers, Compound No. 504 also provides a temporary rust preventive by forming an inhibitive film over cleaned parts. *International Chemical Co., Inc.*

For more data circle No. 47 on postcard, p. 89.

Flow indicator

Flow, or lack of flow, of a liquid through a pipe line is indicated by the Model FI-200 flow indicator. The instrument is compact and simple, dependable, and easy to install. Flow through the unit actuates a switch that can be used

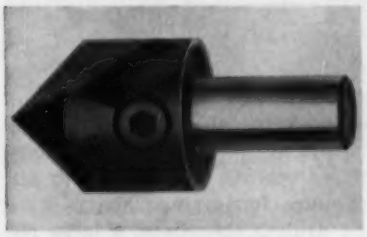


to operate a pilot light, horn or other warning signal. With suitable relays, it can also be used to operate preventive interlocks. The flow indicators accommodate standard pipe sizes from ¼ to 3 in. Any flow over 1.5 gpm causes the indicator to function. *Gems Co.*

For more data circle No. 48 on postcard, p. 89.

Deburring tool

New Nobursink has been engineered for fast, efficient and economical deburring and chamfering of openly accessible hole faces. The tool, with its higher rake angle is said to produce a greater shear or shaving action and promises a longer life between regrinds. As the shaving action is accomplished



with a minimum of pressure, a secondary burr is not developed. The circular, radial relief form of clearance at the cutting edge serves to support the cutting edge against wear and chippage. Two-piece construction permits cone faces to be cylindrically ground on tool and cutter grinders or on any lathe with a tool post grinder. *Nobur Mfg. Co.*

For more data circle No. 49 on postcard, p. 89.

Turn Page

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speeds loads there thru-the-air

Put your handling where it belongs

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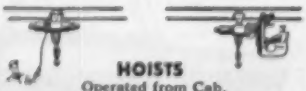

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"... has enabled us to utilize a much greater area of storage space ... ***KRANE KAR*** will be the key element in the operation of new storage areas. Enables us to unload railroad cars and enclosed top highway trailers in minutes where it formerly took hours. We unloaded a car containing 65,000 pounds of flat hammered forgings in three hours. Recommend it to anyone requiring this type of equipment."

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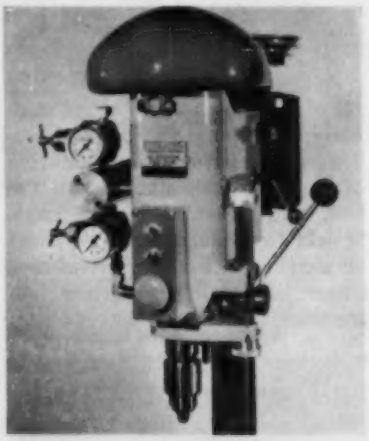
All-purpose lubricant

Ore-Lube is a scientifically developed and proven new lubricant having MoS_2 as a base. Through a unique homogenizing process it contains an even dispersion of molybdenum disulfide which has a tenacious adherence to plate surfaces lubricating under pressures of 100,000 psi, thereby preventing metal wear. It can not be washed out or be squeezed out; is able to withstand temperatures ranging from −20° to +500°F. Seasonal changeover becomes a thing of the past. *Ore-Lube Co.*

For more data circle No. 50 on postcard, p. 89.

Air-hydraulic drill head

An integral air hydraulic drill press head features a choice of completely automatic operation, or, by shutting off air pressure and inserting the removable drill press



handle, manual operation for odd lot drilling jobs. Designed primarily to operate on 30 to 40 lb air pressure for average single spindle drilling operations, a large reserve of gage pressure is available for use in multiple spindle drilling. Design of head favors operator convenience and the setup man. Other features are: the forward hinging pulley guard that makes belt changing readily accessible; micro-depth adjustment by calibrated knob. The drill press heads are easily installed on any round drill press column by removing the old head and slipping on the new. *Rotafeed Co.*

For more data circle No. 51 on postcard, p. 89.

A Complete Line of

COMBUSTION
ACCESSORIES

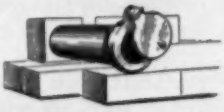
for Every Industrial Liquid Fuel-Gas Installation

Air Control Door and Frame, top hinged, ratchet type, heavy duty, for manual control. Surfaces are machined to a close fit.

Fuel Oil Suction Strainer, single type. Large basket area insures low pressure drop; cover and basket easily removed for cleaning.

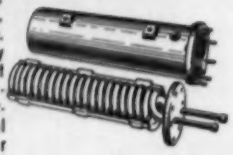
Wide-View Peephole, safety, curtain type. Cobalt glass removed to show bearing surface for curtain. Curtain halves are interlocked—open simultaneously.

Ignition Port with Refractory Tile No. M896 . . . for use with standard 3" pipe. Also serves as a peephole.



Furnace Relief and Access Door, heavy construction, practically air tight. Door casting correctly weighted, lined with plastic refractory retained by imbedded grill; with observation port and cover.

Fuel Oil Heater, Self-Cleaning, Spiral Coil Type. High oil velocity in coil, resultant turbulence prevents carbon formation. No internal connections or joints.



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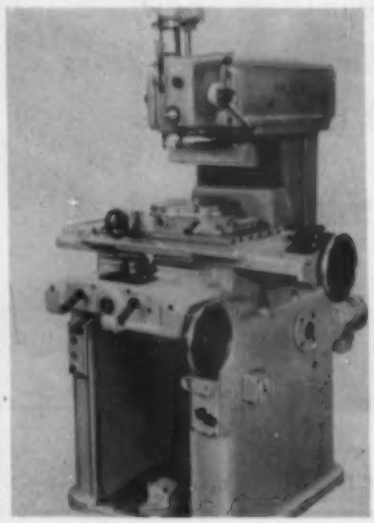
Precision jig borer

While retaining the sensitivity and ease of control of the Hauser 2BA precision jig borer, many new features in the 3 BA model increase its range and usefulness. Among the advantages of the new model are: greater boring capacity, greater height adjustment, heavier



quill, larger table surface and greater table travel. Working surface of the table is 21¾ x 12¾ in.; longitudinal table travel is 15¾ in. Adjustment of vertical slide is 15 in.; vertical travel of boring spindle, 5⅛ in. *Carl Hirschmann Co., Inc.*

For more data circle No. 52 on postcard, p. 89.

High capacity filter

Continuous high capacity with either a completely new stainless steel-cloth bag element or porous stone is provided by the 800 gph capacity Sel-Rex Little Giant filter. The unit can be serviced easily and can be cleaned in less than 15 min. The entire filter element is fastened to the hand tightened cover, and can be lifted out manually for quick and thorough washing. Units are constructed of extra low carbon stainless steel, and furnished complete with operating valves, motor and pump. All iron parts are available for use with alkaline solutions. *Bart-Messing Corp.*

For more data circle No. 53 on postcard, p. 89.

Turn Page

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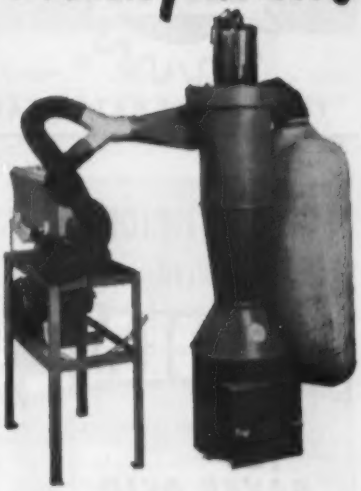
DUST COLLECTORS

Really draw!



A size and model to solve any dust collecting problem, Torit collectors provide complete, all-around dust control. Torit collectors are unitized for custom installation on each machine, giving power and suction only when machine is operating. Keeps plant and machines free from clogging and unsightly dust. Furthermore, cleaned and filtered air is exhausted back *into* the room maintaining heat balance. Find out now how Torit unitized dust control is engineered to your problems.

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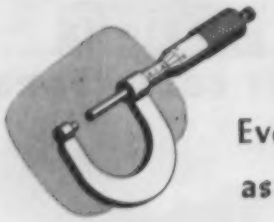

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All plastic duct

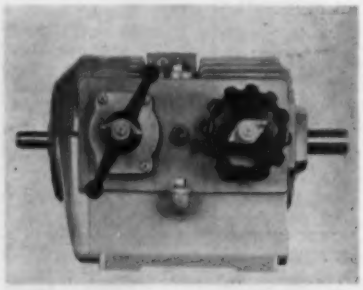
This 20-ft unplasticized polyvinyl chloride duct was fabricated to handle mixed acid fumes. The system removes highly corrosive

fumes at the rate of 13,000 cu ft per min. Use of corrosion resistant polyvinyl chloride eliminates the need for expensive maintenance painting and frequent replacement. *Comco, Inc.*

For more data circle No. 54 on postcard, p. 89.

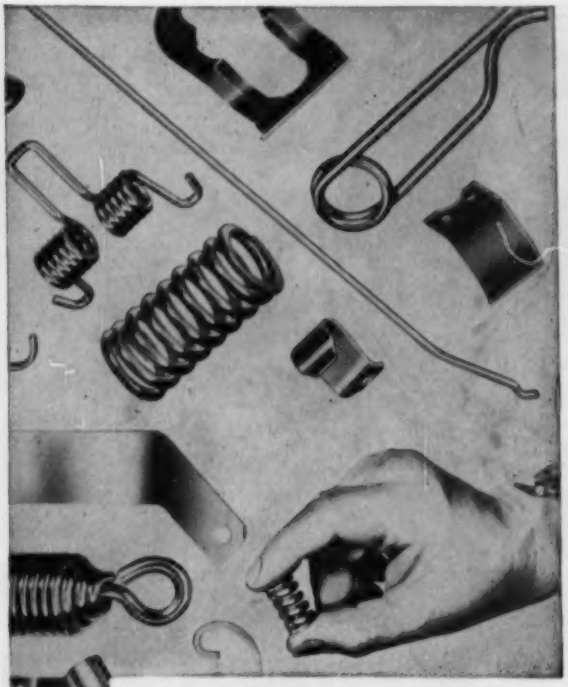
Variable power source

Instantly variable speeds without stopping, automatic braking, positive speed sensitivity, and reverse rotation are features of the Gerotor variable speed hydraulic transmission. It is a compact, self-contained unit consisting of a driven oil pump and an output oil



motor. These rotating elements are incorporated in one air-cooled housing which also acts as the 6-qt oil reservoir. Low internal operating pressures and sturdy ball-bearing construction insure long life. It may be directly coupled to the electric motor supplying the constant speed input power or belt driven from a side or top mounted motor. Overload protection is provided by safety valves. *Gerotor May Corp.*

For more data circle No. 55 on postcard, p. 89.



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Using the Sheffield-Cavitron Ultrasonic Machine Tool to dice germanium in the mass production of transistors. The tool itself consists of 271 pieces of Superior's 18-gage Type 304 needle tubing, cut to ⅜" lengths and silver brazed into a single tool, permitting tolerances as fine as .0005".

NEW ULTRASONIC MACHINE TOOL USES TUBING TO CUT HARDEST, MOST BRITTLE MATERIALS KNOWN

a new application for Superior Tubing

Ultrasonic vibrations do the cutting with this new machine tool, invented and developed by the Cavitron Equipment Corporation, Long Island City, N.Y. In the Cavitron process, a tool is used which has the precise shape of the cavity desired. Finely divided abrasive particles suspended in water are flowed continuously across the work. No movement or vibration is visible when the machine is switched on, although the tool tip vibrates 20,000 times a second through a stroke of .0035". The vibrating tip activates the suspended particles, and microscopic chips are gently excavated without heat, noise or vibration. The tool sinks swiftly into the work under slight pressure, forming a cut or cavity of exactly the same shape as the tip.

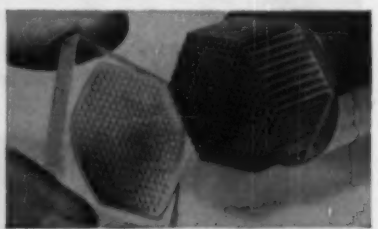
Tools made of Superior tubing save considerable cutting time on relatively large areas. Furthermore, the slender walls (.005" thick) minimize waste of valuable raw material. Cavitron engineers first used carbon tubing for this purpose, but in consultation with Superior engineers switched to AISI Type 304. This material has twice the life of carbon tubing, with much greater resistance to wear. Most important, it resists warping at the silver brazing temperatures needed to join the tubes together.

Your files should contain Superior Bulletin No. 40. It lists over 55 types of available material, including the stainless steels, with valuable selection and application data. Write for your free copy today. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, California.

All analyses available in .010" to ⅝" OD; certain analyses in light walls up to 2¼" OD

Superior Tube
The big name in small tubing

Superior tubes are cut into 2" lengths and silver brazed into a 6-sided tool, which is then cut in half and two complete honeycomblike tools formed—each ⅜" deep. Similar tools are used to cut precision jewel bearings.



Closeup of tool and work shown in top picture. The Cavitron makes it possible to cut and drill intricate shapes in materials which, because of their frangibility or sensitivity to sudden temperature changes, would be impossible to work on a production basis.

The Iron Age SUMMARY . . .

Steel market moves into fall season with heavy backlogs, lagging deliveries . . . Major consumers still humping . . . Outlook continues tight.

From Hot to Hotter . . . The steel market is moving from the frying pan into the fire. The summer "lull" that wasn't there is giving way to the seasonal fall upsurge that promises to be one of the strongest in the post-war period.

Neither producers nor consumers have much to look forward to. On their part, the mills have been forced to slash fourth quarter allotments in an effort to beat down order carryovers. But with it all, they're resigned to heavy backlogs going into 1956.

The automotive industry is going through its model changeover period with scarcely any easing in its steel requirements. Furthermore, the carmakers probably will be looking for heavier tonnages when their production lines get moving at high speed again.

Dog-Eat-Dog Outlook . . . There has been no hint from any major consuming industry that anything like a significant letdown is in the cards. Just the opposite. They're not only pressing for delivery but also pushing and shoving to place advance orders. Some would like to get commitments for first quarter '56 delivery.

Maintenance shutdowns are still a big problem with producers. The lagging ingot rate reflects this and other complications, including tail end of the vacation season.

Plates and structurals are real problem products at both mill and warehouse levels. This is due to a combination of continuing strong demand and emergency requirements for rehabilitation of flood-stricken areas. It's a dog-eat-dog outlook for months to come.

Some fly-by-night operators are trying to take advantage of the flood emergency to bamboozle the mills into shipping steel that would eventually find its way into other channels. But the producers are not falling for it. Every flood emergency appeal is being checked.

Hand-To-Mouth Inventories . . . Meanwhile, steel inventories of many consumers are at low ebb, although generally speaking instances of slowdowns for lack of steel are few and far between. But with the outlook what it is, there's a chance that more industries will be hurt.

One of the hardest hit industries is the railroads. Plates, particularly, are threatening to become a bottleneck that will affect the freight car building program.

Steel operations this week are scheduled at 93 pct of capacity, off 1 pct from last week.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,245	Last Week 2,269	Month Ago 2,148	Year Ago 1,502
Ingot Index (1947—49=100)	139.5	141.0	133.5	93.5
Operating Rates				
Chicago	95.5	96.0	95.0	67.5
Pittsburgh	97.0	97.0	95.0	66.0*
Philadelphia	91.0	92.0	94.0	56.0
Valley	93.0	93.0	92.0	58.0
West	95.0	96.5	96.0	73.0*
Detroit	86.0	88.0	90.0	74.0
Buffalo	100.0	100.0	100.0*	56.5
Cleveland	93.5	97.5*	79.0	59.5
Birmingham	92.0	94.0	23.0	68.0
South Ohio River	90.0	91.5	92.0	79.0
Wheeling	96.0	97.0*	98.0	71.0*
St. Louis	102.0	105.0	98.0	56.0
Northeast	85.0	85.0*	85.0	47.0
Aggregate	93.0	94.0	89.0	63.0*

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.801
Pig Iron (Gross ton)	$59.05	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$43.83	$43.83	$44.00	$28.67
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	22.20
Copper, electrolytic	43.00	43.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	14.05
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	95.375	95.75	97.00	92.75
Zinc, E. St. Louis	12.50	12.50	12.50	11.00

STEEL PRODUCT MARKETS

Heavy Carryovers Into '56

Mills cut allocations to reduce backlogs . . .
But runover into first quarter is accepted outlook for many products . . . Warehouses are feeling the pinch.

◆ STEEL ORDER carryovers into 1956 are shaping up as a real problem for both mills and consumers. The hope of reducing these heavy backlogs is behind drastic fourth quarter allocation cuts made by producers on most products.

But steel companies are admitting there will be sizeable carryovers in sheets, bars, structurals, plates, and other items. And with major consuming industries looking forward to another big production year in '56, there seems little chance of an easier market for an indefinite period in the New Year.

Consumers are pressing the mills to accept 1956 business now. But few if any producers will commit themselves to a delivery promise that far ahead.

In addition to further tightening the market for structurals and other urgently-needed sections for reconstruction purposes, the flood that hit Northeastern U. S. several weeks ago has confronted producers with another problem: opportunists who are trying to get delivery on the pretense that it's needed for flood repair work.

Wary mills are taking a close look at every request for flood emergency allotments. They are expediting shipment of bona fide flood-zone orders, but are shutting the door on fakers who can't prove the steel they want will be used for emergency reconstruction.

Galvanized sheet requirements for the Government's grain bin program are putting more pressure on the available supply of this product and sheets generally, hot rolled coils particularly. As a result, it's tougher than ever to come by a tonnage of sheets.

The warehouses are beginning to feel the pinch in most areas. They're faced with the twin problems of strong demand from their customers and slowing deliveries from the mills. Some distributors report their inventories of structurals and plate are practically zero. Hot rolled bars and sheets also are tight warehouse items.

SHEETS AND STRIP . . . Some mills are trying to hold allotments to 85 pct of capacity in hope of reducing backlogs and improving their delivery promise picture. But heavy carryovers into 1956 are looked for. Galvanized sheets for the Government's grain bin program are imposing a further burden on supply.

BARS . . . Consumers are ready to place first quarter '56 business but producers are holding off. Some users are waving defense priorities at the mills in hope of obtaining additional tonnage, but they are being told to take it from their regular allotment. Reinforcing bar demand continues heavy, with likelihood of large carryovers into the New Year. Building contractors are ordering through fourth quarter, indicating they intend to continue work during the cold weather.

Purchasing Agent's Checklist:

EDITORIAL: Is there enough steel capacity? ..... p. 7

STEEL: Backlogs loom ahead for 1956 ..... p. 127

PLASTISOLS: Handy, low cost coatings ..... p. 77

MARKETING: More products can be packed in metal tubes . . p. 32

PLATES . . . Supply is so short in relation to demand that some consumers face the prospect of cutting back on their operations. The railroads, particularly, are hard up for enough plates to keep their carbuilding program rolling. Lone Star Steel Co. increased price of carbon plates $3 per ton to $4.85 per cwt effective Aug. 26. New price for billets, blooms, and slabs is $74.50 per ton.

STRUCTURALS . . . Flood zone requirements, although not pinpointed as yet, will be heavy. Other consumers will be pushed further back on their deliveries. This will worsen as more tonnages are moved into the flood area.

WIRE . . . Expected cutbacks in automotive ordering failed to materialize. With this, plus strong demand from appliances, furniture, and other consuming industries, the manufacturers' wire market is one of the strongest. Merchant wire is experiencing a seasonal lull in some areas, although the flood, which shut down a major producer for several days, seemed to trigger an upsurge in orders at several mills. Farm repair requirements after the harvest are expected to strengthen demand.

TUBULAR PRODUCTS . . . Market continues tight for virtually all pipe and tube products.

WAREHOUSE . . . Biggest problem is getting delivery from the mills. Inventories are dangerously low on some products. In **Pittsburgh**, stocks of plates and structurals are practically non-existent. Hot rolled bars and sheets are tight.

STAINLESS . . . Behind the recent reduction in price of columbium-bearing stainless grades is a cut in price of ferrocolumbium from $12 to $6.90 per lb, and of ferro tantalum-columbium from $6.50 to $4.65 per lb. And behind this was completion of the Government's columbium ore buying program of 15 million units. Under its buying agreement with foreign producers, the Government was paying a 100 pct bonus, which forced civilian ferro alloy producers to pay the same price in order to compete. With the Government out of the picture, the price of ore reverted to a normal market level. Columbium-stabilized stainless and high temperature alloy grades are used chiefly in jet aircraft applications.

Comparison of Prices

(Effective Sept. 6, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 6 1955	Aug. 30 1955	Aug. 9 1955	Sept. 7 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.82
Plate	4.52	4.52	4.52	4.237
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terns	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.312¢
Cold-finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp. (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.801¢

	Sept. 6 1955	Aug. 30 1955	Aug. 9 1955	Sept. 7 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.38	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢

‡ 74-76 pct Mn base.

Pig Iron Composite: (per gross ton)				
Pig iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$45.00	$29.50
No. 1 steel, Phila. area	46.50	46.50	43.50	27.00
No. 1 steel, Chicago	40.50	40.50	41.50	29.50
No. 1 bundles, Detroit	39.00	38.50	38.50	23.50
Low phos., Youngstown	47.50	47.50	46.50	31.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	44.50	42.50
No. 1 mach'y cast, Philadel'h	46.50	46.50	46.50	40.50
No. 1 mach'y cast, Chicago	52.50	52.50	52.50	39.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$43.83	$43.83	$44.00	$28.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$13.25	$13.25	$13.25	$14.88
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	36.00	30.00
Copper, Lake, Conn.	40.00	40.00	36.00	30.00
Tin, Straits, New York	*95.375*	*95.625*	97.00	92.75
Zinc, East St. Louis	12.50	12.50	12.50	11.00
Lead, St. Louis	14.80	14.80	14.80	14.05
Aluminum, virgin ingot	23.20	23.20	23.20	23.20
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b. subject to switching charges.

←To identify producers, see Key on P. 140→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00	.....	.....	.....
Birmingham *W9*	54.50	55.00	59.00	.....	.....
Birmingham *U4*	54.50	55.00	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	54.50	55.00	55.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	63.50
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Daingerfield *L3*	55.00	55.00	55.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

* DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $87.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	23.75	15.00	—	15.25 b
Slabs, billets, rerolling	22.25	24.75	26.75	28.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	—	40.25	—	43.00	64.00	49.25	64.75	31.75	—	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	59.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W3*, *J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U3*; New Castle, Ind., *I3*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W7*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U3*; Washington, Pa., *J3*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Forndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J3*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.; Detroit, *R5*

Prices Hold in Firm Market

Light activity leaves most prices unchanged in Chicago, Pittsburgh and the East . . . Detroit, West Coast show only general gains . . . Composite unchanged.

◆ SCRAP prices remain unchanged at major centers as a small amount of new activity confirmed old levels.

General feeling is that market is strong and that significant new buying will maintain or improve price levels. Chicago reports dealers holding scrap in anticipation of a rising market. Steel operating rates are up. Export is steady.

Meanwhile, action was light and spotty. Price of No. 1 heavy melting inched up 50¢ in Detroit. San Francisco and Los Angeles reported steelmaking grades up $1 to $2. St. Louis and Cincinnati showed scattered gains and losses.

THE IRON AGE Composite for No. 1 heavy melting remains unchanged at $43.83.

Parts of New York's Third Ave. El have already been turned into new steel. Bethlehem Steel says scrap is moving into furnaces at Bethlehem a few days after it is cut down. The 70-year-old structure is expected to yield 35,000 tons of steel scrap.

Effects of the eastern flood, which were expected to push the price in East Coast markets upwards, have not yet been reflected in the price structure. Mills along the Atlantic seaboard are not particularly well-heeled in terms of inventory and substantial buying will have to be done in the not-too-distant future. Present high levels will be tested.

Pittsburgh . . . While no major purchases were reported, a mill on the fringe of the district purchased a small tonnage of open hearth scrap with No. 1 heavy melting at $45, No. 2 heavy melting at $41 and No. 2 bundles at $37. These prices were 50¢ to $1.50 under this mill's purchases last month with substantially lower tonnages involved. A tonnage of industrial bundles was sold locally at prices ranging from $47 to $49.50 with the weighted average in the neighborhood of $48. Other transactions on openhearth grades are expected shortly and should confirm market prices at least at current levels. Activity on other grades is light with prices stable.

Philadelphia . . . No buying of major proportions appeared to ruffle the status of the market. Continued strength was evident and a very small tonnage, too moderate to constitute the market, was sold last week at $1 over the quoted price of No. 1 heavy melting. However, more substantial orders within the spread were filled. Scrap is not too plentiful and inventories far from capacity, indicating sustained strength for some time.

Chicago . . . Market strength of the past several weeks is still holding up with prices maintaining earlier levels. There is strong feeling that several large mill buyers will be coming in with representative tonnage orders this week. While there is no doubt that scrap activity is continuing at a firm level, it appears that dealers are still willing to hold supplies in anticipation of strengthening prices when new mill orders begin coming in.

New York . . . Prices of steel making grades are unchanged in a strong, steady New York market. No new mill buying is reported but brokers are undisturbed. They point to steel operating rates and see heavy new orders as just a question of time.

Detroit . . . A local mill made a buy this week on a $39.50 FOB basis. Indications are that the market has started to level off and will remain firm at least through September. But prices are expected to go down in October when most of the automakers begin production on 1956 models, increasing the amount of scrap generated in the area.

Cleveland . . . Two smaller tonnage purchases at $47 for No. 1 heavy melting for one Valley mill and one on fringes confirmed present Valley prices in absence of major buys. Monthly industrial lists sold for about 50¢ higher than previous sale largely on broker speculation. Dealers' yard stocks moving very slowly with some price resistance.

Birmingham . . . With the exception of electric furnace grades, little scrap of any kind is moving in the district this week. Openhearth buyers are staying out of the market and major foundries are holding the price line on cast. A few small foundries, badly in need of scrap, are paying above the established price but buying only limited quantities. Dealers, on the other hand, do not seem anxious to sell at present prices, believing an advance will come soon.

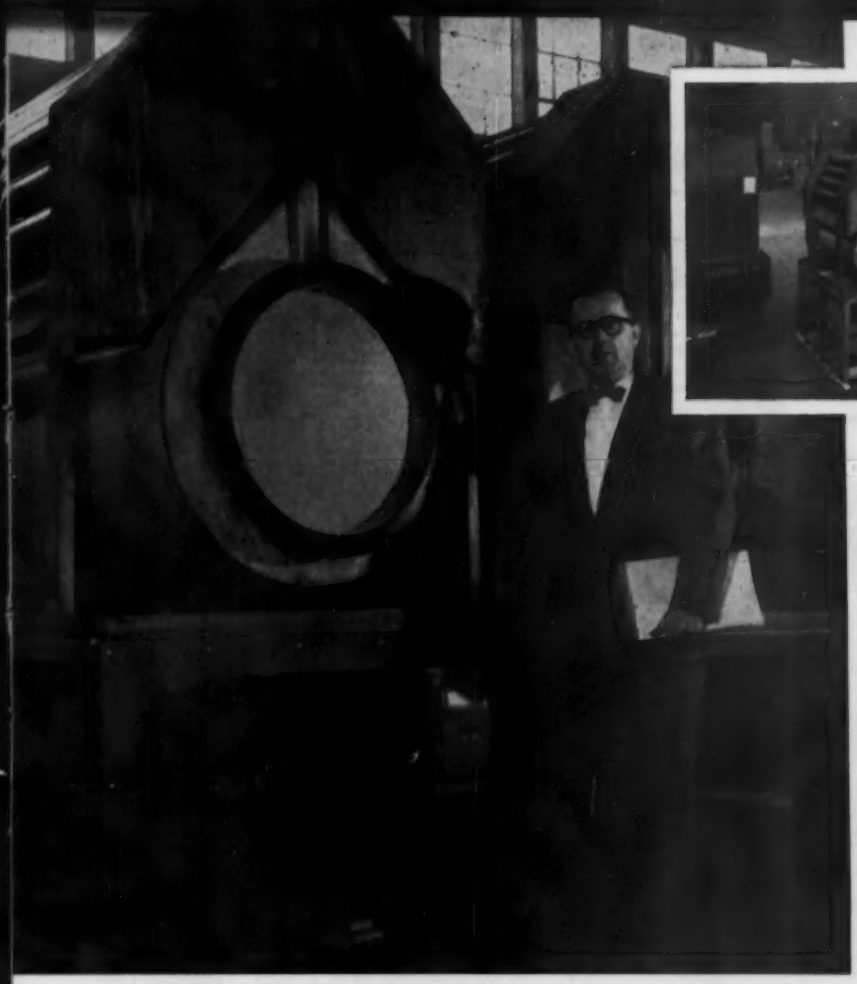
St. Louis . . . Demand by district foundries who are quite busy has caused considerable activity in such items as angles and splice bars, locomotive tires uncut, axles, railroad specialties, and car wheels, bringing advances of $2 to $7. Otherwise prices are generally unchanged. Receipts continue to be in line with consumption.

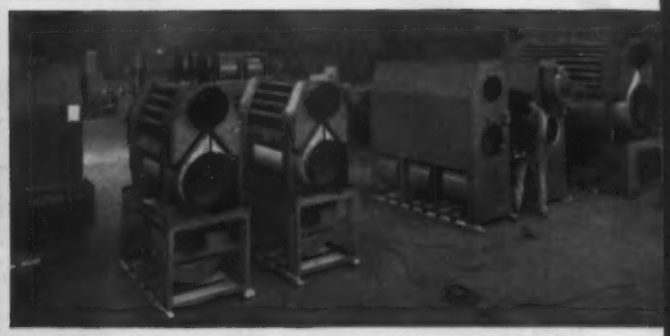
Cincinnati . . . Openhearth scrap in immediate area remained unchanged with major local consumer expected to buy soon. If sales fail to materialize dealers will probably resume barge shipments to Pittsburgh. Rail market took sudden jump of up to $4 on some grades when re-rolling mills started bidding up short supplies.

Buffalo . . . New buying at current prices or very near them is expected in local scrap market in coming weeks. Steady tendencies prevailed as brokers cleared old orders from leading mills in the area.

Boston . . . Market is still slow in this area. The normal September pick-up has not materialized. Feeling is that heavy summer buying has left mills with scrap stocks ample for current needs.

West Coast . . . Continuing near-capacity steel operating rates and heavy scrap exports combined to force prices up in San Francisco and Los Angeles. No letup seen in hot exporting pace. Seattle market steady with no price changes.





Final assembly of the heaters. Teardrop design of the firebox eliminates turbulence, permits entire surface to be wiped by air flow.

Mr. George Costello, Secretary-Treasurer, displays the Stainless Steel firebox for a National Heater.

Firebox is upside down for finish welding. Welders and other workers report no difficulty fabricating the Stainless Steel.

1945: Heater size reduced 25% with Stainless Steel

TODAY: *Increased unit efficiency—increased heater sales*

National Heater Company, St. Paul, Minn., has been making quality industrial heaters for 20 years. In 1945, they looked for a way to reduce the *size* of the units without reducing efficiency.

Primarily, it was a problem of moving the steel firebox walls closer to the flame. But carbon steel would eventually oxidize and lose its shape when brought too close to the flame. So they tried Stainless Steel, and it worked.

The new firebox was made from 14-gauge Stainless Steel. It retained its shape, strength and durability at the elevated temperature. It also eliminated the need for a refractory material.

The new firebox was 25% smaller than the old one. The Stainless Steel has given superb performance, and sales have increased.

There have been no fabricating problems. National Heater uses the same equipment for Stainless Steel that they use for carbon steel.

No other metal combines the corrosion resistance, strength, appearance and easy fabricating properties of Stainless Steel. Keep this remarkable metal in mind when you plan a new design — and for top quality, specify service-tested USS Stainless Steel.

See "THE UNITED STATES STEEL HOUR," Televised alternate weeks. Consult your newspaper for time and station.

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USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

Scrap Prices *(Effective Sept. 6, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and ms. turns.	29.00 to 30.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	45.00 to 49.00
Heavy turnings	42.00 to 42.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	50.50 to 51.50
Rails 2 ft and under	54.00 to 55.00
RR. steel wheels	51.50 to 52.50
RR. spring steel	51.50 to 52.50
RR. couplers and knuckles	51.50 to 52.50
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	36.00 to 37.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	40.00 to 41.00
No. 2 dealers' bundles	31.00 to 32.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. forge crops	48.00 to 49.00
Low phos., punch'gs, plate	46.00 to 47.00
Low phos. 2 ft and under	45.00 to 46.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	52.00 to 53.00
Rerolling rails	64.00 to 65.50
Rails 2 ft and under	57.00 to 58.00
Locomotive tires, cut	45.00 to 46.00
Cut bolsters & side frames	48.00 to 49.00
Angles and splice bars	53.00 to 54.00
RR. steel car axles	64.00 to 65.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	53.00 to 53.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	39.00 to 40.00
Cast iron brake shoes	37.00 to 39.00
Cast iron car wheels	44.00 to 45.00
Malleable	51.00 to 52.00
Stove plate	39.00 to 40.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	27.50 to 28.50
Mixed bor. short turn.	27.50 to 28.50
Cast iron borings	27.50 to 28.50
Shoveling turnings	30.00 to 31.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. 2 ft and under	49.00 to 50.00
Low phos. punch'gs	49.00 to 50.00
Elec. furnace bundles	47.00 to 48.00
Heavy turnings	42.00 to 43.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	53.00 to 54.00
Cupola cast.	36.00 to 38.00
Heavy breakable cast.	44.00 to 45.00
Cast iron car wheels	49.00 to 50.00
Malleable	50.00 to 51.00
Unstripped motor blocks	28.00 to 30.00
No. 1 machinery cast	46.00 to 47.00

Cleveland

No. 1 hvy. melting	$43.50 to $44.50
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	43.50 to 44.50
No. 2 bundles	38.00 to 38.00
No. 1 busheling	43.50 to 44.50
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Cut struct'r'l & plates, 2 ft & under	48.00 to 49.00
Drop forge flashings	43.00 to 44.00
Low phos. punch'gs, plate	44.00 to 45.00
Foundry steel, 2 ft & under	47.00 to 48.00
No. 1 RR. heavy melting	47.00 to 48.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Railroad grate bars	36.00 to 37.00
Steel axle turnings	29.00 to 30.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast.	49.00 to 50.00
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Youngstown

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	47.00 to 48.00

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 busheling	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	29.00 to 30.00
Low phos. plate	45.00 to 46.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	52.00 to 53.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 bundles, openhearth	38.50 to 39.50
No. 2 bundles	29.00 to 30.00
New busheling	38.50 to 39.50
Drop forge flashings	38.00 to 39.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. punch'gs, plate	38.50 to 39.50
No. 1 cupola cast	40.00 to 41.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	36.50 to 37.50
No. 2 bundles	29.50 to 30.50
Machine shop turn.	23.00 to 24.00
Cast iron borings	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
No. 1 RR. hvy. melting	44.00 to 45.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	52.00 to 53.00
Locomotive tires uncut	48.00 to 49.00
Angles and splice bars	48.00 to 49.00
Std. steel car axles	48.00 to 49.00
RR. specialties	48.00 to 49.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	46.00 to 47.00
Malleable	42.50 to 43.50
Unstripped motor blocks	38.50 to 39.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	25.50 to 26.50
No. 1 busheling	35.00 to 36.00
Elec. furnace, 2 ft & under	36.00 to 37.00
Machine shop turn.	17.50 to 18.50
Mixed bor. and short turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	35.00 to 36.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	32.00 to 33.00
Charging box cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Unstripped motor blocks	24.00 to 25.00

Birmingham

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	34.00 to 35.00
Bar crops and plate	40.00 to 41.00
Structural and plate, 2 ft	39.00 to 40.00
No. 1 RR. hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	47.00 to 48.00
Rails, 18 in. and under	51.00 to 52.00
Angles & splice bars	48.00 to 49.00
Rerolling rails	53.00 to 54.00
No. 1 cupola cast.	46.00 to 47.00
Stove plate	43.00 to 44.00
Charging box cast.	27.00 to 28.00
Cast iron car wheels	36.00 to 37.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans.	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	23.00 to 24.00
Low phos., 18 in. & under	43.00 to 44.00
Rails, random lengths	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	38.00 to 39.00
Drop broken cast.	49.00 to 50.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	32.00
No. 1 bundles	34.00
No. 2 bundles	29.00
No. 3 bundles	25.00
Machine shop turn.	12.00
Cast iron borings	11.00
No. 1 RR. hvy. melting	34.00
No. 1 cupola cast.	42.00

Los Angeles

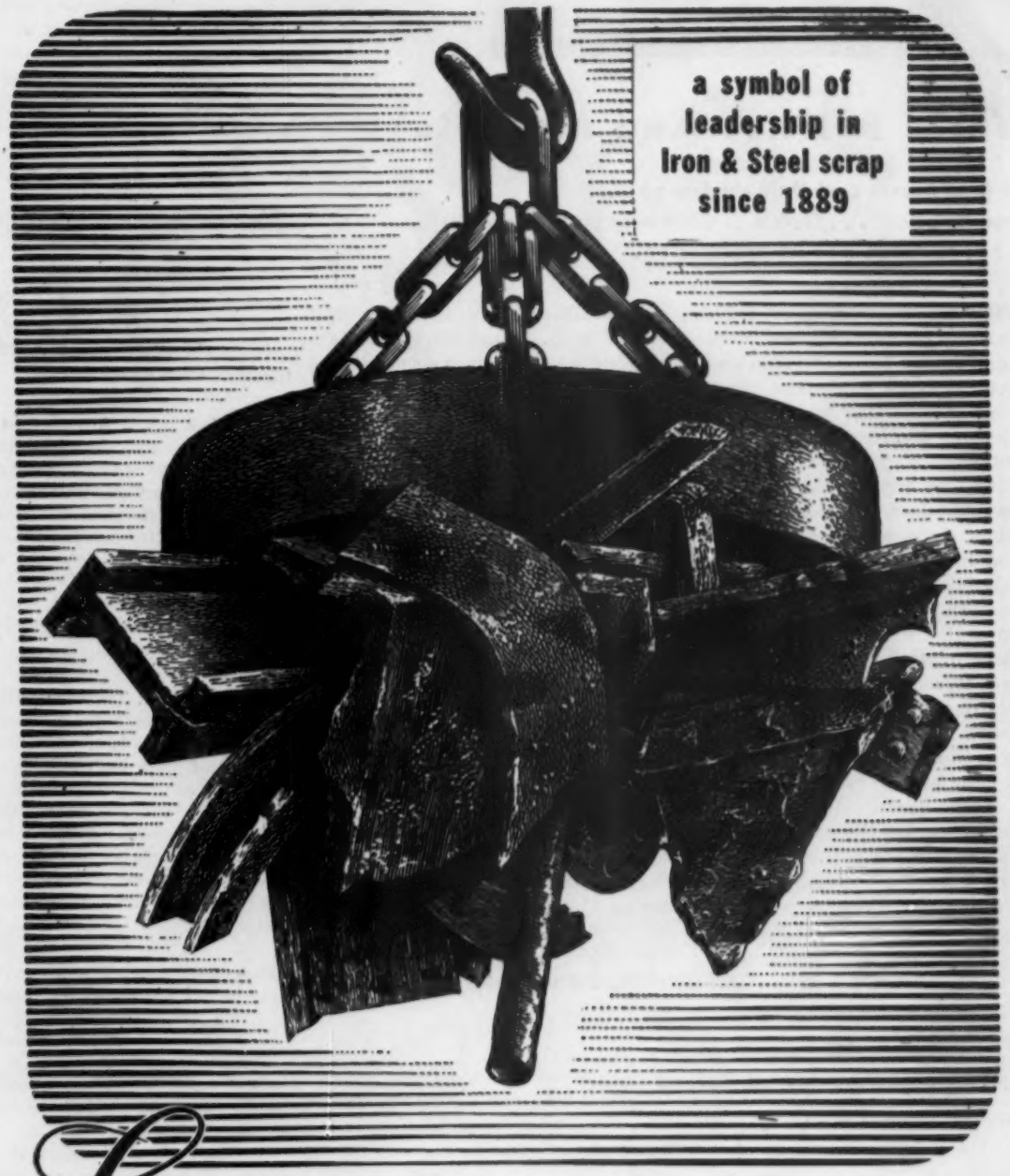
No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 1 bundles	33.00
No. 2 bundles	28.00
No. 3 bundles	24.00
Machine shop turn.	10.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. furn. 1 ft and under	32.00
No. 1 RR. hvy. melting	33.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$38.50
No. 2 hvy. melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Bushelings	33.50
Bush., new fact. prep'd	36.50
Bush., new fact. unprep'd	32.50
Machine shop turn.	16.00
Short steel turn.	25.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	47.50
Cast scrap	42.00 to 45.00



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World Politics And Markets

Far flung events cast their shadow on the domestic prices . . . Strikes in Chile may push Copper up . . . Malayan election steadies tin.

◆ THE DIRECT effect of world politics on the price United States consumers pay for nonferrous ores which are imported to any extent was sharply pointed up this week in reports from two widely separated areas.

Chile, the world's third largest copper producer, responsible for much of the copper used for fabrication in this country, reported a paralyzing strike of workers in a wide variety of fields. The latest word is that many are starting to go back to work. But 29,055 men, mostly treasury, custom, and port administration employees, are still out with no sign of an early settlement. Reading between the lines it is quite easy to see that no copper of any consequential quantity is going to leave the country until these key men are back on the job.

Since copper is the main item in the Chilean economy a considerable amount of revenue is being lost. The government would obviously like to make this up.

The difference in the price of copper in U. S. and Europe offers an ideal way. If much copper that was initially earmarked for this country was to find its way to Europe, the gain would be enough in a relatively short period of time to offset the strike loss.

A move like this would unbalance a little further the already offset supply-demand ratio and could result in only one thing—another domestic copper price boost.

An indication that this machinery is already in motion is the fact that the Chilean senate has agreed to consider the government's request for extraordinary powers for six months to deal with the situation.

From the other side of the world comes a report that the Alliance Party in Malaya succeeded in garnering 51 out of 52 elective seats in the Federal Legislative Council. The victory of this group friendly to the United States and pledged to "the encouragement of capital investment in prospecting and mining and the improvement of methods, of extraction and recovery of tin ore," means that the supply of straits tin can be counted on to keep pace with the increased domestic consumption.

At present the U. S. takes 60 pct of the Malayan tin exported which accounts for 67 pct of our industrial consumption.

Indications of this more stable market can be gleaned from the slight downward trend of the prevailing tin price in this country that has been noted recently.

Zirconium . . . A rarity in this period of the rising price is zirconium which has been reduced in price up to 40 pct. The primary markets for this minor metal are the chemical industry and for nuclear reactors. The reduction in price was made possible, according to Carborundum Metals Co., Inc. the prime producer, by reduction in the cost of producing the metal.

Aluminum . . . The big expansion in the aluminum field in terms of new primary producers is over. It is expected that Defense Mobilizer Flemming will be very selective from here on. He will okay Certificates of Necessity for one or two new entrants but will definitely avoid doing so on a large scale. New government purchase contracts will also be kept to a minimum.

Magnesium . . . The magnesium trade, in the process of an extensive education promotion campaign to spur greater use of its product, is receiving a boost from the U. S. Air Force. A jet fighter, the F-80C, is being constructed of all magnesium by East Coast Aeronautics, Inc. The use of magnesium in structural construction is nothing new, but this is the maiden attempt to adapt an all magnesium design to the frame of an existing aircraft.

Although still in the experimental stage, a number of distinct advantages have presented themselves toward possible future mass production.

One is that the supply of magnesium is almost limitless. Initial estimates indicate that aircraft could cost 20 pct less. Greater structural rigidity eliminates the number of stiffeners, thus increasing fuel capacity. Number of structural parts and fasteners can also be reduced by use of magnesium.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Aug. 31	Sept. 1	Sept. 2	Sept. 3	Sept. 5	Sept. 6
Copper, electro, Conn.	43.00	43.00	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	43.00	43.00
Tin, Straits, New York	95.625	95.625	95.50	95.50	95.375	95.375
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

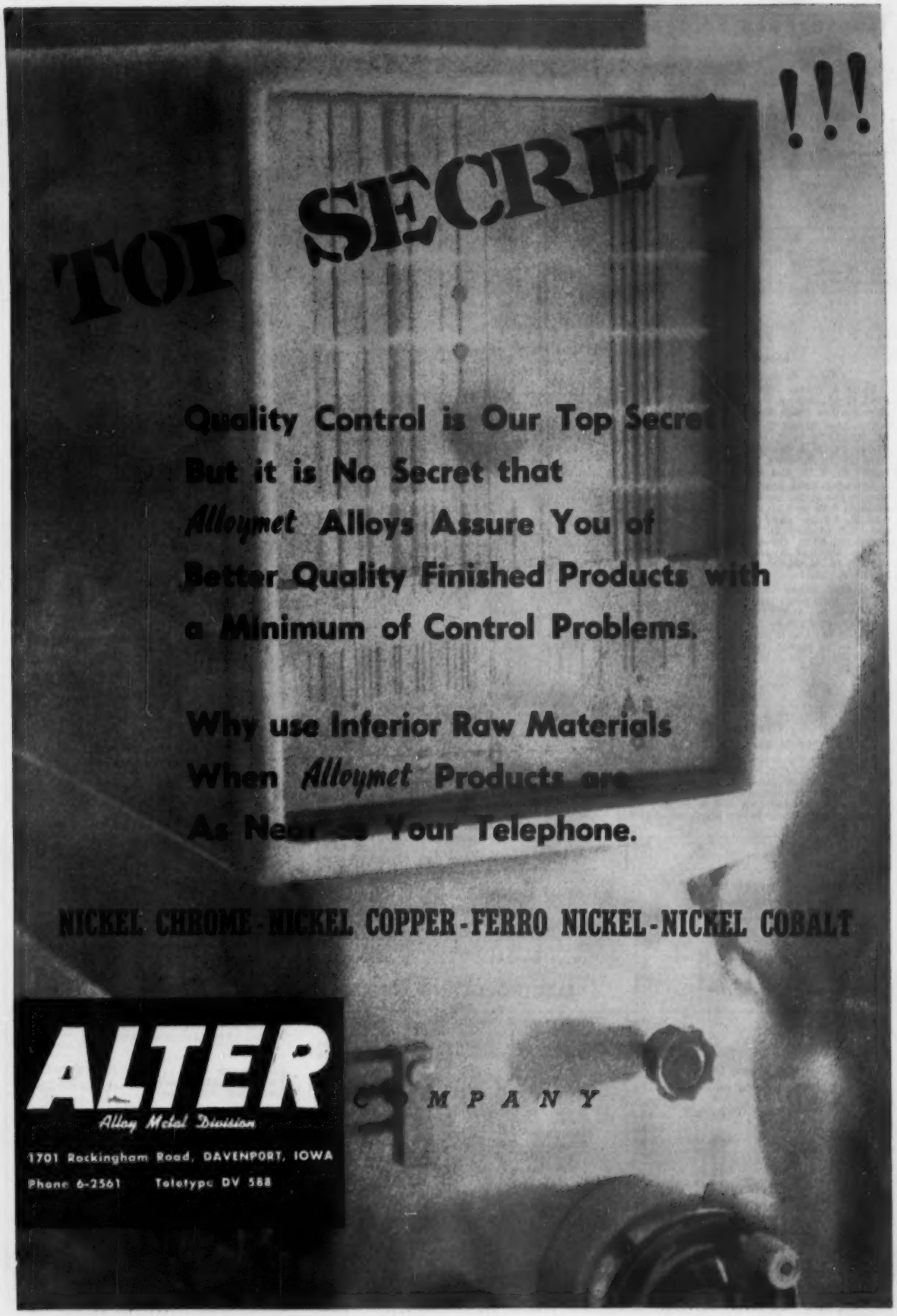
Note: Quotations are going prices **Tentative*

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in August based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	95.375
Del'd Conn. Valley	38.26	Zinc, E. St. Louis	12.50
Lake copper, delivered	37.04	Lead, St. Louis	14.80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COMPANY

Nonferrous Prices *(Effective Sept. 6, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	40.8	38.7	37.5	36.5
2004	45.7	41.4	39.7	39.1
5052	48.3	43.4	41.7	39.9
2024-O, -OAL	51.2	42.5	41.0	41.2
7075-O, -OAL	62.6	50.8	48.5	46.6

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 75¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ⅜ to ⅝ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ⅝ diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.3¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD, ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	96
Seamless Tube	122	108	153
Shot, Blocks		85	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	56.79		58.86
Copper, h-r	56.76	55.11	
Copper, drawn		56.36	
Low brass	53.16	52.09	
Yellow brass	49.27	49.21	
Red brass	54.54	54.48	
Naval brass	52.83	47.14	48.40
Leaded brass			48.74
Com. bronze	56.48	56.42	
Mang. bronze	56.57	50.67	52.38
Phos. bronze	77.14	77.64	
Muntz metal	50.94	46.76	48.00
Ni silver, 10 pct	63.05	66.13	68.80
Beryllium copper, CR, 1.9% Be, Base 5000 lb, f.o.b.			
Strip			$1.54
Rod, bar, wire			1.51

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb cont'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$90 to $100
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$255 to $257
Nickel electro	64.50
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$22 to $24
Platinum, dollars per troy oz.	$80 to $87
Silver, New York, cents per troy oz.	90.75
Tin, New York	95.375
Titanium, sponge, grade A-1	$8.95
Zinc, East St. Louis	12.50
Zinc, New York	13.00
Zirconium, sponge	$7.50 to $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	42.50
No. 120	42.00
No. 123	41.50
80-10-10 ingot	
No. 305	45.75
No. 315	44.00
88-10-2 ingot	
No. 210	59.25
No. 215	55.25
No. 245	48.75
Yellow ingot	
No. 405	34.75
Manganese bronze	
No. 421	38.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	31.25-32.50
0.60 copper max.	31.00-32.25
Piston alloys (No. 122 type)	31.00-32.00
No. 12 alum. (No. 2 grade)	30.00-30.75
108 alloy	30.00-30.50
195 alloy	31.25-32.25
13 alloy (0.60 copper max.)	31.50-32.25
AXS-679	30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	30.50-31.50
Grade 2—92-95%	29.50-30.50
Grade 3—90-92%	28.50-29.50
Grade 4—85-90%	28.00-28.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	50.92
Electrodeposited	43.25
Brass, 80-20	
Cast, oval, 15 in. or longer	55.00
Zinc, flat cast	20.25
Ball, anodes	19.00
Nickel, 99 pct plus	
Cast	98.50
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	76.00
Copper sulphate, 99.5 crystals, bbl.	13.75
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25
Nickel chloride, 300 to 400 lb.	43.50
Silver cyanide, 100 oz. lots, per oz.	81⅝
Sodium cyanide, 96 pct domestic 200 lb drums	19.80
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅝	26⅝
Red brass	34½	33½
Comm. bronze	35⅝	35
Mang. bronze	27	25⅝
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42½
No. 2 copper wire	41
Light copper	38⅝
*Refinery brass	37½

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42½
No. 2 copper wire	41
Light copper	38⅝
No. 1 composition	34½
No. 1 comp. turnings	34
Rolled brass	25½
Brass pipe	26
Radiators	27½
Aluminum	
Mixed old cast	19½—20
Mixed new clips	20½—21½
Mixed turnings, dry	19½—21

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	38 —38½
No. 2 heavy copper and wire	37 —37½
Light copper	35 —35½
New type shell cuttings	33½—34
Auto radiators (unsweated)	23 —23½
No. 1 composition	29½—30
No. 1 composition turnings	28½—29
Unlined red car boxes	23 —23½
Cocks and faucets	24½—25
Mixed heavy yellow brass	22 —22½
Old rolled brass	23 —24
Brass pipe	25½—26
New soft brass clippings	25 —25½
No. 1 brass rod turnings	23 —23½
Aluminum	
Alum. pistons and struts	16½—17
Aluminum crankcases	17 —17½
1100 (2S) aluminum clippings	19 —19½
Old sheet and utensils	16½—17
Borings and turnings	10½—11⅛
Misc. cast aluminum	16½—17
2024 (24s) clippings	17½—18
Zinc	
New zinc clippings	7½— 8
Old zinc	5 — 5½
Zinc routings	3¾
Old die cast scrap	3½
Nickel and Monel	
Pure nickel clippings	92
Clean nickel turnings	75
Nickel anodes	92
Nickel rod ends	92
New Monel clippings	44½
Clean Monel turnings	34
Old sheet Monel	40
Nickel silver clippings, mixed	22
Nickel silver turnings, mixed	18
Lead	
Soft scrap lead	11½—12
Battery plates (dry)	6½— 6¾
Batteries, acid free	4¼
Magnesium	
Segregated solids	18½—19
Castings	17½—18
Miscellaneous	
Block tin	77
No. 1 pewter	64
Auto babbitt	42 —43
Mixed common babbitt	14⅛
Solder joints	17½—20
Siphon tops	42
Small foundry type	16½
Monotype	15
Lino. and stereotype	14 —14¼
Electrotype	12 —12⅛
Hand picked type shells	10⅝
Lino. and stereo. dross	5¼
Electro dross	5

IRON AGE

STEEL PRICES

(Effective Sept. 6, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.125 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* 7.00 *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.125 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.60 *N7* 7.10 *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.325 *A1, N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroi , Mich.			$96.00 *R3*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Sept. 6, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 18 ga.	Enameling 12 ga.	Long Terne 18 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.325 *A1, W6*					6.375 *U1*				5.025 *A5, N4, R5*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.025 *Y1*	$8.90 *I3, U1, Y1*	$7.50 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$7.60 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *N3, R3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$8.90 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$8.90 *J3, U1*	$7.50 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$8.90 *W3, W5*	$7.50 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.										5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Sept. 6, 1955)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.00 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.00 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.50 *C4*		6.30 *C4*		
	Coatesville, Pa.							4.50 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *C3*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.00 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P15*	4.65 *N4,R3, P15*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.00 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.00 *G3*	4.60 *G3*			6.625 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.00 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1,I3, Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.00 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.00 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10* 7.665 *F2*	6.00 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.90 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Sept. 6, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Gray Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp, Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J
P11 Production Steel Strip Corp., Detroit
P13 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ in.		¼ in.		⅜ in.		½ in.		¾ in.		1 in.		1¼ in.		2 in.		2½–3 in.		2 in.		2½ in.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	15.50	0.25	15.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Youngstown *R3*	17.50	0.25	20.50	4.25	23.00	7.75	25.50	9.00	26.00	10.00	26.50	10.50	28.00	10.75								
Fontana *K1*	6.00	+9.25	9.00	+5.25	11.50	+1.75	14.00	+1.00	14.50	+0.00	15.00	0.50	16.50	0.25								
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fairless *N2*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.00	10.00	26.00	9.75								
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Youngstown *R3*	22.0	6.25	26.00	10.25	28.00	13.75	28.50	13.00	29.00	14.00	29.50	14.50	30.00	13.75								
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Sharon *M3*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Pittsburgh *N1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Wheatland *W4*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Youngstown *Y1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Lorain *N2*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

	SEAMLESS							
	3 in.		3½–4 in.					
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.				
Sparrows Pt. *B3*								
Youngstown *R3*								
Fontana *K1*								
Pittsburgh *J3*	13.00	+3.75	14.50	+2.25				
Alton, Ill. *L1*								
Sharon *M3*								
Fairless *N2*								
Pittsburgh *N1*	13.00	+3.75	14.50	+2.25				
Wheeling *W5*								
Wheatland *W4*								
Youngstown *Y1*	13.00	+3.75	14.50	+2.25				
Indiana Harbor *Y1*								
Lorain *N2*	13.00	+3.75	14.50	+2.25				
EXTRA STRONG PLAIN ENDS								
Sparrows Pt. *B3*								
Youngstown *R3*								
Fairless *N2*								
Fontana *K1*								
Pittsburgh *J3*	15.50	+0.25	20.50	4.75				
Alton, Ill. *L1*								
Sharon *M3*								
Pittsburgh *N1*	15.50	+0.25	20.50	4.75				
Wheeling *W5*								
Wheatland *W4*								
Youngstown *Y1*	15.50	+0.25	20.50	4.75				
Indiana Harbor *Y1*								
Lorain *N2*	15.50	+0.25	20.50	4.75				

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¼ and ⅜-in., 2 pt.; ½, ¾ and 1-in., 1 pt.; 1¼ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

Steel Prices *(Effective Sept. 6, 1955)*

To identify producers, see Key on preceding page

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *UI*	4.725	5.65	5.825				
So. Chicago *R3*				7.50			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.50		5.625	
Gary *UI*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.50		5.525	
Johnstown *B3*		5.65					
Joliet *UI*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Minnequa *C6*	4.725	6.15	5.825	7.50		5.625	12.40
Pittsburgh *O1*					11.90		12.40
Pittsburgh *P5*							12.40
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.90
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*UI*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A8*	154	167		175	180	7.50	8.025
Bartonville *K2**	154	168		175	181	7.50	8.075
Buffalo *W6*						7.40	7.80
Chicago, Ill. *N4**	152	166		173	179	7.40	7.975
Cleveland *A6*	157					7.40	
Cleveland *A5*						7.40	
Crawfordsville *M4**	154	167		175	175	7.50	8.05
Donora, Pa. *A5*	152	162		173	175	7.40	7.80
Duluth *A5*	152	162		173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162		173	175	7.40	7.80
Galveston *D4*	157						
Houston *S2*	167	178			188	7.65	8.05
Johnstown, Pa. *B3**	152	166			175	7.40	7.80
Joliet, Ill. *A5*	152	162		173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154		175	177	7.50	7.90
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	167	174		178	188	7.65	8.05
Minnequa *C6*	157	167	162	178	188	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*		162	162				
Pittsburgh, Cal. *C7*	171	185			195	8.35	8.75
Portsmouth *P7*						7.40	
Rankin, Pa. *A5*	152	162			175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*				197	195	8.35*	8.75
Sparrows Pt. *B3**	154			175	181	7.50	8.075
Struthers, O. *Y1*						7.40	7.90
Worcester *A5*	158					7.70	
Williamsport, Pa. *S5*			169				

* Galvanized products computed with zinc at 12.5¢ per lb. where indicated. Zinc at 5¢ per lb. for others.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	
Detroit *D2*	7.10	9.05	10.60		
Harrison, N. J. *C11*			10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*					
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*	7.55	9.25	10.80	12.95	15.65
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.94	
	2½	12	41.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
National Tube	2	13	30.87	36.51	29.94	
	2½	12	42.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
Pittsburgh Steel	2	13	30.87	36.51		
	2½	12	41.57	49.16		
	3	12	47.99	56.76		
	3½	11	56.03	66.27		
	4	10	74.41	88.00		

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities / City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (18 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore $.10	7.03	8.32	9.10	7.65		7.21	7.93	7.61	8.62	14.38	13.46-13.96	16.36	16.29-16.49
Birmingham .15	6.80	7.90	8.85	7.06		6.99	7.28	7.08	9.35				
Boston .10	7.70	8.81	10.27	7.94-7.96	10.30	7.89	8.13	7.83	9.53	13.65-13.80	13.40-13.45	16.65	16.50
Buffalo .30	6.80	8.05	9.70-9.77	7.15		7.15	7.40	7.10	7.90		13.10		16.15
Chicago .25	6.80	7.93	8.50	7.06		6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati .25	6.92	7.92	8.99	7.30		7.28	7.75	7.32	8.05	13.44	13.09	16.29	16.14
Cleveland .30	6.80	7.93	8.85	7.15		7.16	7.61	7.14	7.85		12.91		15.96
Denver	8.60	10.00	11.22	8.90		8.60	8.75	8.90	9.82				17.97
Detroit .25	6.99	8.12	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston	7.85	8.75	10.49	8.15		7.80	8.20	8.25	9.85-9.95		14.00		17.05
Kansas City .20	7.47	8.60	9.17	7.73		7.66	7.95	7.75	8.52		13.52		
Los Angeles .10	8.05	10.00	11.00	8.35		8.05	8.30	8.05	11.25		14.25		17.85
Memphis .10	7.12	8.25		7.38		7.31	7.60	7.40	9.15				
Milwaukee .25	6.89	8.02	8.59	7.15		7.08	7.45	7.17	7.94		12.94		15.99
New Orleans .15	7.20	8.35		7.45		7.40	7.70	7.50	9.50				
New York .10	7.46	8.68	9.44	8.07	9.95	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk .20	7.25			7.65		7.45	7.95	7.65	9.50				
Philadelphia .10	7.14	8.42	9.35	7.67		7.37	7.74	7.64	8.46	13.51	13.16	16.36	16.21
Pittsburgh .25	6.80	7.93	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland .10	7.80	8.80	10.65	8.00		7.75	7.85-8.15	7.95	11.80		15.00		17.50
Salt Lake City .20		10.60		9.35			9.20	9.15					
San Francisco .10	8.10	9.65	10.15	8.35		8.05	8.25	8.05	11.20*		14.25		17.85
Seattle .00	8.55	10.40	10.80	8.65		8.20	8.30	8.35	11.70		14.60		17.65
St. Louis .25	7.09	8.22	9.19	7.35		7.23	7.68	7.37	8.14	13.40	13.14	16.35	16.19
St. Paul .25	7.46	8.59-9.14	9.16	7.72		7.65	7.94	7.74	8.51		13.51		16.38

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb. $.25 delivery.

* Plus analysis charge.

Miscellaneous Prices

(Effective Sept. 6, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium	.77
Oil hardened manganese	.43
Special carbon	.39
Extra carbon	.33
Regular carbon	.275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb, f.o.b.

	Plate (*A3, J2, L6*)			Sheet (*I2*)
Cladding	10 pct	15 pct	20 pct	20 pct
Stainless Type 304	30.30	33.15	36.05	32.50
316	35.50	38.45	41.40	47.60
321	32.60	34.85	37.75	37.25
347	34.40	37.90	41.60	46.25
405	25.80	29.60	33.35	.....
410, 430	25.30	29.10	32.85	.....

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$26.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	26.25
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Swedeland, Pa., f.o.b.	24.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.48
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	60	30.25	10	60	11.80
3	60	32.00	8	60	12.10
2½	30	33.75			
2	24	35.50			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
⅛ in. & smaller x 4 in. & shorter	+5	17
⅛ in. & smaller x 6 in. & shorter	+12	11
9/16 in. & ⅝ in. x 6 in. & shorter	+13	10
¾ in. & larger x 6 in. & shorter	+16	7
All diam. longer than 6 in.	+25	net
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	+10	12
Lag, all diam. x 6 in. & shorter	+2	18
Lag, all diam. longer than 6 in.	+11	12
Plow bolts	18	18

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
⅝" or smaller	55	64
⅞" to 1¼" inclusive	55	63
1⅜" to 1½" inclusive	57	65
1⅝" and larger	51	61

C.P. Hex. regular & hvy.

⅝" and smaller	55	64
⅞" and larger	51	61

Hot Galv Nuts (all types)

⅝" or smaller	38	50
⅞" to 1½" inclusive	36	49

Finished, Semi-finished, Slotted or Castellated Nuts

⅝" and smaller	55	66
⅞" and larger	51	63

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Per Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ¼" thru ⅜" diam. x 6" and shorter	24	20
9/16 and ⅝" x 6" and smaller and shorter	21	16
¾", ⅞", 1" x 6" and shorter	8	+11
New std. hex head, bulk* ¼" thru ⅜" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	45	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list	27	38
Bulk, bulk list		
	Quantity	
¼-in. diam. & under	25,000-200,000	20 61
5/16-in. diam. & larger	15,000-100,000	20 61
All diam. over 3 in. long	5,000-100,000	.. 61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list	24	27
Bulk, bulk list		
	Quantity	
⅝-in. diam. & smaller	25,000-200,000	18 20

CAST IRON WATER PIPE INDEX

Birmingham	104.2
New York	116.5
Chicago	121.0
San Francisco-L. A.	126.1

Class B or heavier, 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	.....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	.....
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	138.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick — *Per net ton*

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.35
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite — *St. ⅝-in., grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

Dead Burned Dolomite — *Per net ton*

F.o.b. bulk, producing points in: Pa. W. Va., Ohio	$15.00
Midwest	15.40
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	9.5¢ / 10.75¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	57.75¢
Copper, reduced	57.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	17.5¢ to 25.0¢

LEON SWIRBUL

Portrait by Fabian Bachrach

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The **Iron Age**

Ferroalloy Prices

(Effective Sept. 6, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ..	36.00	0.15% C ...	33.75
0.025% C, Simplex ..	34.50	0.20% C ...	33.50
		0.50% C ...	33.25
0.06% C ...	34.50	1.00% C ...	33.00
0.10% C ...	34.00	2.00% C ...	32.75
65-69% Cr, 4-9% C			24.75
62-66% Cr, 4-6% C, 6.9% Si			25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.13
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 3-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	20.50
Ton lots	23.60
Less ton lots	25.10

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 46 to 53%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	32.85	35.05
0.17% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0%Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50%Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si.	20.00	75% Si.	14.40
50% Si.	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$3.05	$2.95	$3.75
Less ton lots	3.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta. ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00

10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton ltos, per lb contained Ti $1.50

Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27

bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, carloads, packed	25.25¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

Silcaz, contract basis, delivered.

Ton lots	45.00¢

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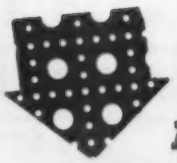

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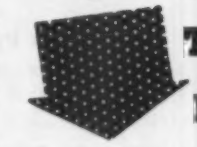

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Pittsburgh Prospers . . . Pressure for the expansion of steel producing and processing facilities continues to boom the sale of used and rebuilt machinery in the Pittsburgh area.

Contrary to the normal summer trend, August inquiries and sales, like July's, are as good and in most cases better than during the second quarter of the year. Sales were up in August and a further increase is expected in September, which would make third quarter business far better than a good second quarter.

Sales and inquiries continue at high levels, But requests for a great variety of late model equipment are not so easily filled as the strong demand of the past few months has substantially reduced the equipment available to dealers.

Want Fast Service . . . On top of this, customers want everything in a rush. With the heavy demand for steel and related products, makers of these products can't afford any excess loss in production.

Of late, used and rebuilt machinery dealers have found an increasing number of customers who will take older model equipment, if the price is right, in lieu of unavailable late models.

Crane Sales Hold . . . Crane sales are running about the same as a month ago. There is a stronger demand for long span cranes, 75 to 80 ft in length, and this type crane is hard for dealers to come by. Same thing is true of heavy dc cranes of all sizes. Inquiries have come from all over the country plus quite a few from foreign sources. While U. S. inquiries cover a variety of large and small type cranes, the foreign requests were mostly for sizes of the 5 to 10 ton variety.

The month of August was much better than July for sales of steel mill equipment and on the basis of inquiries already in, September will see progressively better business. The demand is chiefly for equipment on the heavier side with complete mill installations the general rule.

Push Rebuilders . . . Electrical equipment rebuilders are keeping busy. August was at least as good and probably better than July. Rebuilders are handling all the work they can with existing work forces.

Customers are putting on plenty of pressure for rush deliveries, additional service and other special concessions. This is a reflection of additional maintenance from the high use of facilities necessary to meet today's strong product demand.

Tool Interest Mounts . . . Machine tool inquiries are better than ever, but most are for late models which are tougher than ever to get. Dealers continue to quote new equipment on many inquiries. Demand is about equal between large and small machine tools.

A new trend developing among the new machine tool manufacturers could have an effect on used machine tool sales in the future. At least one manufacturer has placed a long term guarantee on new equipment.

Small machine shops are continuing a slow pickup in business, but not enough to slow up the high mortality rate. Union pressure is adding to the overhead of smaller shops as even shops with three or four employees are unionizing.

The used and rebuilt machinery trade is cheerful, right down the line, over the present and future outlook. As long as high production and expansion continue, business will remain good for used and rebuilt machinery.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
8' x 2/16" Bertsch Initial Type
12' x ¼" Hilles & Jones Pyramid Type
10' x ⅜" Bertsch Initial Type Bending Roll
20'x 1" Hilles & Jones Pyramid Type Bending Roll
BRAKES—LEAF TYPE
8' x ¼" Dries & Krump Size 186
12 x ⅛" Dreis & Krump, Motor Driven
BRAKES—PRESS TYPE
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10' x 3/16" Cincinnati No. 70
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Clyde Double Drum Electric Car Puller, Capacity 42,750# Max. Starting Pull
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5 ton P&H Trav-Lift	20' Span 220/440 A.C.
5 ton Northern	57' Span 220/3/60 A.C.
5 ton Toledo	60' Span 230 Volt D.C.
5 ton Cleveland	90' Span 230 Volt D.C.
10 ton P&H	35' Span 230 Volt D.C.
10 ton Niles	50' Span 230 Volt D.C.
10 ton Shaw	72' Span 230 Volt D.C.
10 ton Northern	75' Span 230 Volt D.C.
10 ton P&H	90' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.

DIEING MACHINE
25 ton Henry & Wright, 1⅛" Stroke, Double Roll Feed, Scrap Shear
DRAW BENCHES
50,000# Standard Double Draw, 45' Length of Draw
100,000# Standard Double Draw, 25' Length of Draw
FORGING MACHINES
1" to 5" Acme, Ajax, National
4", 5", 7½" National High Duty, Air Clutch
FURNACES
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1½-ton Heroult Side Charge, With Transformer

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STEAM FORGING—600 lb. to 20,000 lb.
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52" McKay 17 Rolls 3⅝" Dia.
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60" Aetna Standard 17 Rolls 4½" Dia.
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PRESSES—HYDRAULIC
350 ton BD Wood Hydr. Joggling Press
500 ton HPM Fastraverse 4-Col., Press, 42" Stroke, 54" Daylight Bolster 48" x 72"
1257 ton Baldwin Southwark Forging Press, 20" Stroke Main Ram, 54" x 41" Bet. Columns
1300 ton Lake Erie 4-Column, 36" Stroke 48x48" Bet. Columns, 12' RtoL Overall of Bed
PUNCH & SHEAR COMBINATIONS
Style EF Cleveland, 36" Throat, Punch 1¼" thru 1" No. 16 Pels Universal Ironworker with Coper & Notcher
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6x6x1" Long & Allstatter Size B
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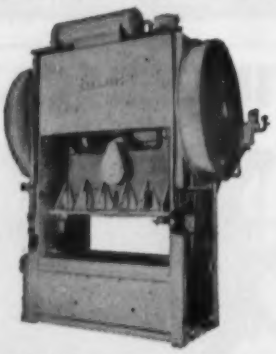

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SLIP RING MOTORS

Constant Duty, 3-phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	2500	G.E.	MT-	2300	240
1	2000	G.E.	MT	6600	600
1	1250	Whse.	CW	6600	593
1	1250	G.E.	MT	2300	357
1	750	G.E.	I-M	2300	400
1	600	Whse.	CW	2300	444
1	500	G.E.	MT	6600	600
1	500	Al. Ch.	ANT	2300	514
1	500	G.E.	I-M	2300	450
1	400	G.E.	I-M	2300	900
1	400	Al. Ch.	ANT	2300	514
1	400	G.E.	MT	2300	360
1	250	Al. Ch.	ANT	2300	440
1	250	Al. Ch.	ART	440	720
1	250	G.E.	MT	2300	300

We can supply complete control with any of these.

SQUIRREL CAGE MOTORS

3 Phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	400	G.E.	IK	2300	514
1	200	Whse.	CS-373	2300	1160
1	200	Al. Ch.	AR	440/220	600
1	150	Whse.	CS	440/220	600
1	125	Al. Ch.	AR	2300	495
1	100	Al. Ch.	AR	2300	695
1	100	Al. Ch.	AR	2300	495

SYNCHRONOUS MOTORS

3-Phase, 60-Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
2	2100	G.E.	unity	2300	360
2	3000	G.E.	80%	2300	720
1	750	G.E.	80%	2300	450
1	710	G.E.	80%	2300	720
2	700	G.E.	80%	2300	1200
3	600	G.E.	unity	2300	327
1	250	G.E.	80%	2300	514
1	250	G.E.	80%	440	450
2	200	Whse.	80%	440	1200
1	200	G.E.	80%	440	450
1	150	G.E.	80%	2300	900
1	150	Whse.	80%	440/220	450
2	125	G.E.	80%	4000/2300	900
3	125	Elec. Mchy.	80%	4800/2400	900
2	100	Whse.	80%	440/220	1800
2	100	G.E.	80%	440/220	600
1	100	Elec. Mchy.	unity	440/220	360

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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	Whse.	Tandem	550	600
1	2200	G.E.	MCF	600	400/500
3	1500	Whse.	Hor.	600	600
1	1400	G.E.	MCF	600	63/190
1	1200	G.E.	MCF	600	750/950
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	250	300/900
2	450	Whse.		550	415
1	350	Whse.		250	340/900
1	250	G.E.	MPC	230	400/600
1	200	Rel.	1978T	230	720
3	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
6	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	360/950
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	SK-141	230	500/1500
1	125	Whse.	SK-183	230	850
1	125	G.E.	MD8-416	230	415

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500	25cy 600	11000
1	2000	G.E.	514	600	6600/13200
1	2000	G.E.	450	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514	30/115	4800/13800
2	1400	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
2	4200	G.E.	FOWT	3	13500x115/230
1	3000	Wagner	HPW-20	3	26400x2400
3	2000	G.E.	HVDDJ	1	66000x13800
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x480
3	667	G.E.	HD	1	13400x2300

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AUTO. CHUCKERS: (2)—WARNER & SWASEY #1AC, 6", new in 1954, completely equipped.

VERT. LATHES: BULLARD 30" "Cutmaster" vert.; mfd. in 1952, Bullard "New Era" 36" vert. (1943).

BORING BARS: UNIVERSAL "Triway" 3" 1942, Giddings & Lewis #32-3".

LATHES: (14)—MONARCH, AMERICAN, "PACEMAKER", AXELSON, HENDEY AND BRADFORD TOOL ROOM LATHES, 30½x84, 25x72, 20x67, 20x43, 16x54 and 14x30—late type, 1941 to 1947.

TURRET LATHES: (40)—WARNER-SWASEY 3A, 1A, #5, #4, #3, #2, bar feed, pre-selector and plain. (2)—GISHOLT #5—#3, (2) JONES & LAMSON #3, (1) MONARCH 18" turret, all 1941 to 1947 mchs.

PREC. BORERS: (21)—EX-CELL-O 1 and 2 Spdl. Hyd. models DB112C, DB2112A, DB2112C, mfd. from 1941 to 1952. KRUEGER 2 Spdl. vert. hyd. Borer & Reamer.

MILLERS: (10)—KEARNEY & TRECKER 2H, 3H, 1B univ. and plain. (2)—CINN. 2 MH plain.

COINING PRESSES: MINSTER #90—800 ton, 1945, TOLEDO #664—600 ton.

S.S. & HYD. PRESSES: NIAGARA #510—7 w. cushion (1951), (4) MINSTER #40-5 w. cushions (1943), (3) TOLEDO #54, #55, and #50½, Dennison 6 ton hyd. (1944) Logan hyd.

O.B.I. PRESSES: (18) MINSTER #7 - #5 - #4 - #3 all late 1941 to 1945, V, and O #50.

GRINDERS, CENTERLESS: (2) CINN. #3M and 2M filmatic, (2)—CINN. plain cent.

GRINDERS, CYL. and INT.: (17) LANDIS, BROWN & SHARPE and CINN. #2 and 3 univ. filmatic 10x24, 12x30, 10x18, 14x36, plain and univ. HEALD 72A—int. late type.

GRINDERS, SURFACE: THOMPSON 14" x 40" type C twin wheel, new 1952. (6) REID, B&S, ABRASIVE and WILMARTH and MARMAN magnetic.

PROD. LATHES: (35) LEBLOND rapid prod. and "multi-cut" 13" to 26", (8) SUNDSTRAND mod. 8 auto., (8) LO-SWING & FEDERAL, (4) FAY auto. 8", 12".

DRILL PRESSES: (8) LELAND-GIFFORD, 4 spdl. 1943-1944, #2-LMS, (2)—FOOTE-BURT 3 spdl., (3) GOVRO NELSON multiple, (3) BARNES camelback mult., (1) P&W #1B deep hold hor. 2 spdl., mfd. in 1948.

BROACHES: (12)—OILGEAR & PORTER horiz. mod. XL20, 6M20, 5M16, mfd. 1945-1947.

PROD. MILLS: (36)—KENT-OWENS & NICHOLS models 2-20, 1-14, 1M, 2RV and #2, 1941 to 1952.

LAPPERS: NORTON #26 hydrolap 1943, Excello center lapper lathe.

RADIAL DRILLS: FOSDICK "Economax" and CINN.-GILBERT, late type, 4'-11", mfd. 1943.

TESTING LAB: TINIUS-OLESON 120,000 lb. tensile, BAUSCH & LOMB spectrograph, spectrograph aux. equipt., Hoskins furnace, centrifuge, etc.

MISC. MCH. TOOLS: WOHLFAHRT D.E. Borers and reamer (1947), PORTER D.E. bearing finisher (1947), LEES-BRADNER 40A tapper, GROVO NELSON multiple drills, FISHER #1 oil grooverS (1943), American Shapers, chamfering mchs., 2 and 4 spd., (2) GROB metal saws (1952), (3) 6-spdl. BABBITT spinners, pattern shop, and many other items.

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Rockford Shaper Planer, 36" Universal Open Side Mechanical Table Drive
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30"x30"x8' Cincinnati, belted m.d., 2 rail heads
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36"x36"x8' Cincinnati, m.d., 2 heads on rail
36"x36"x10' Betts, belted m.d., 2 heads on rail, 2 side heads
36"x36"x10' Gray, Extra Heavy Pattern, m.d., 2 heads on rail
36"x36"x10' Niles-Bement-Pont, belted m.d., 1 head on cross rail
36"x36"x12' Betts, m.d., 2 heads
36"x36"x12' Gray, 3 heads
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48"x48"x12' Cincinnati, 4 heads
48"x48"x18' Niles-Bement-Pond, 2 heads, belt
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200	Ridgeway	2300	250
170	G.E.	440	125
150	Al.-Ch.	2300	275
150	Westg.	2300	125/150
150	G.E.	440	275
100	G.E.	2300	250
100	Westg.	440	125
100	G.E.	440	125
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ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A

Accurate Perforating Co. 145
*Acheson Colloids Co. 91
Allen Manufacturing Co. 92
Allis-Chalmers Mfg. Co. 14, 15
Alter Company 135
*American Chemical Paint Co... 124
American Society for Metals..... 67
American Steel & Wire Div., United States Steel Corp..... 131
*American Welding & Mfg. Co., The 50
American Zinc Sales Co..... 24
Armel, James P. 150
*Armstrong Bros. Tool Co..... 145

B

*Babcock & Wilcox Co., The, Tubular Products Div. 40
Bailey, William M., Co..... 106
Baker, J. E., Co., The..... 64
Baker Industrial Truck Div. of The Baker-Raulang Co. 10
Belyea Co., Inc. 149
Benkart Steel & Supply Co..... 151
Bennett Machinery Co. 148
Bethlehem Steel Co. 1
Brownell, Hazard, Machine Tools, Inc. 147
Browning, Victor R., & Co., Inc... 154
Bullard Co., The 45

C

Canton Drop Forging & Mfg. Co., The 154
Carpenter Steel Co., The..... 23
Century Steel Corporation 152
Chicago Electric Co. 150
*Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp. 108
*Cincinnati Gear Company, The 124
*Cincinnati Grinders, Inc. 48
Cincinnati Milling Machine Co., Grinding Wheels Div. 36
*Cleveland Metal Abrasive Co... 63
Colorado Fuel & Iron Corp., The, Wickwire Spencer Steel Div.... 46
Columbia-Geneva Steel Div., United States Steel Corp..... 131
Consolidated Vacuum Corp.....20, 21
*Cooper Alloy Corp. 84
Cowles Tool Co. 145
Crawford, F. H., & Co., Inc..... 148
*Crucible Steel Co. of America.. 39
Curry, Albert, & Co., Inc..... 148

D

Davidson Pipe Co., Inc..... 151
De Vilbiss Co., The.....96, 97
Diamond Construction Company 151
Differential Steel Car Co..... 117
Donahue Steel Products Co..... 147
Dony, D. E., Machinery Co..... 148
Dreis & Krump Mfg. Co..... 153
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept. Between Pages 56, 57
*Duraloy Co., The 112

E

Eastern Machine Screw Corp., The 153
Eastern Machinery Co., The..... 150
Electric Equipment Co. 148
*Elwell-Parker Electric Co., The.. 61
Enterprise Galvanizing Co. 154
Erie Strayer Co. 113
Espen-Lucas Machine Works, The 154

F

Falk Machinery Co. 147
Finkl, A., & Sons Co..... 12
*Foote Mineral Co. 11
Frank, M. K. 151

G

*Garlock Packing Co., Inc..... 109
General Refractories Co. 95
Geneva Iron & Metal Co..... 151
Gleason Works 103
Globe Steel Abrasive Co..... 13
Goodman Electric Machinery Co. 148
Goss & DeLeeuw Machine Co.... 153
Gray Iron Founders' Society, Inc. Between Pages 16, 17
Greenpoint Iron & Pipe Co., Inc. 150
Griffin Manufacturing Co. 145

H

Hanna Furnace Corp., The..... 9
Hayward Company, The 153
Hendrick Manufacturing Co..... 120
Henry, A. T., & Company, Inc... 147
Holcroft & Company 62
Hoskins Manufacturing Co. Inside Front Cover
Hughes, Arnold, Co. 150, 151
Hyman, Joseph, & Sons..... 148

I

Independent Engineering Co., Inc. 60
Inland Steel Co. 66
Iron & Steel Products, Inc..... 146
Ivins, Ellwood, Steel Tube Wks., Inc. 154

J

*Jones & Laughlin Steel Corp.... 34
Jones Employment 152

K

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Chemicals Div. Between Pages 16, 17
Kasle Steel Corp. 150
Kinderman, Leu F. 147
Kramer, Andy 152

(Continued on Page 154)

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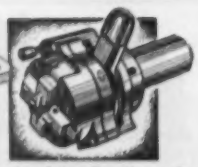

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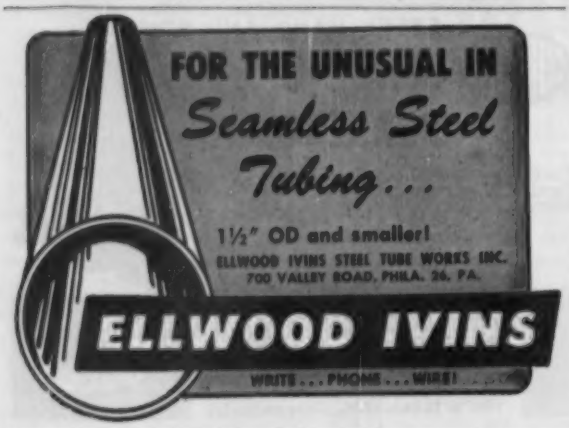
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ADVERTISERS IN THIS ISSUE

(Continued from Page 153)

L

*Laminated Shim Co., Inc., Stampings Div. 102
Land, L. J., Inc. 150
Lang Machinery Co. 147
Leeds & Northrup Co. Between Pages 16, 17
Leland-Gifford Co. 154
Lurie Bros. & Co., Inc. 133

M

McLouth Steel Corp. Between Pages 40, 41
MacCabe, T. B., Co. 149
Magnethermic Corp. 43
*Mahon, R. C., Co., The 107
Manhattan Rubber Div., Raybestos-Manhattan, Inc. 17
*Manning, Maxwell & Moore, Inc. 114
*Marchant, Geo. F., Co. 122
Meriwether, George M. 151
Midvale Company 26
Miles Machinery Co. 148
*Monsanto Chemical Co., Organic Chemicals Div. 65
Morrison Railway Supply Corp. .. 151
Mueller Brass Company 111

N

*National Research Equipment Corp. 85
National Airoil Burner Co., Inc. 123
National Business Bourse, Inc. 152
National Machinery Exchange 148
National Steel Corp. 56
National Tube Div., United States Steel Corp. 131

O

*Oakite Products, Inc. 101
Ohio Ferro-Alloys Corp. 52
Osborn Mfg. Co., The 5

P

Pangborn Corp. ... Inside Back Cover
Papesch & Kolstad, Inc. 148
*Pittsburgh Lectromelt Furnace Corp. 16
Pittsburgh Steel Co. 98, 99
Platt Bros. & Co., The 153
Purdy Company, The 151

R

Rail & Industrial Equip. Co., Inc. 151
*Randolph Laboratories, Inc. 93
Raybestos-Manhattan, Inc., Manhattan Rubber Div. 17
*Republic Steel Corp. 104, 105
Roebling's, John A., Sons Corp. .. 22
Ryerson, Jos. T., & Son, Inc. 6

S

Sargeant & Wilbur Heat Treating Corp. 145
Service Steel, Div. Van Pelt Corp. 145
*Sharon Steel Corp. 8
*Shepard Niles Crane & Hoist Corp. 121
*Shore Instrument & Mfg. Co., Inc., The 145
*Silent Hoist & Crane Co. 122
*Skelly Oil Co., Industrial Div. ... 125
Smith, A. O., Corp. 18, 19
Solar Aircraft Co. 152
*Standard Conveyor Co. 110
Standard Oil Co. of Indiana 83
Stevens, Frederic B., Inc. 4
Stone, R. J. 148
Stueck, W. Whitney, Inc. 153
Sun Oil Co. 54
*Superior Tube Co. 126

T

Tennessee Coal & Iron Div., United States Steel Corp. 131
*Thomas Flexible Coupling Co. ... 116
Timken Roller Bearing Co., The Front Cover
Torit Manufacturing Co. 123
Trayer Products, Inc. 151

U

United Engineering & Foundry Co. Between Pages 56, 57
United States Steel Export Co. ... 131
United States Steel Corp. 131
United States Steel Supply Div., United States Steel Corp. 131
U. S. Steel Wire Spring Co., The 125

V

Valley Mould & Iron Corp. 58
*Vanadium-Alloys Steel Co. 115
Verson Allsteel Press Co. Back Cover

W

Wallack Bros. 151
Warren Iron & Metal Co. 151
Washington Steel Corp. 120
Weirton Steel Co. 56
Weiss, B. M., Co. 151
Weiss Steel Co., Inc. 151
*Wheelabrator Corp. Between Pages 40, 41
*Wheelock, Lovejoy & Co., Inc. ... 100
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Corp. 46
Wigglesworth Industrial Corp. 148
Winternitz, Adolph 149
Wyckoff Steel Co. 86

Y

*Yale & Towne Mfg. Co., Powdered Metal Products Div. 94

CLASSIFIED SECTION

Clearing House 146-151
Contract Manufacturing Appears in first and third issue of each month. See Aug. 18 & Sept. 1
Employment Exchange 152
Equipment & Materials Wanted .. 151

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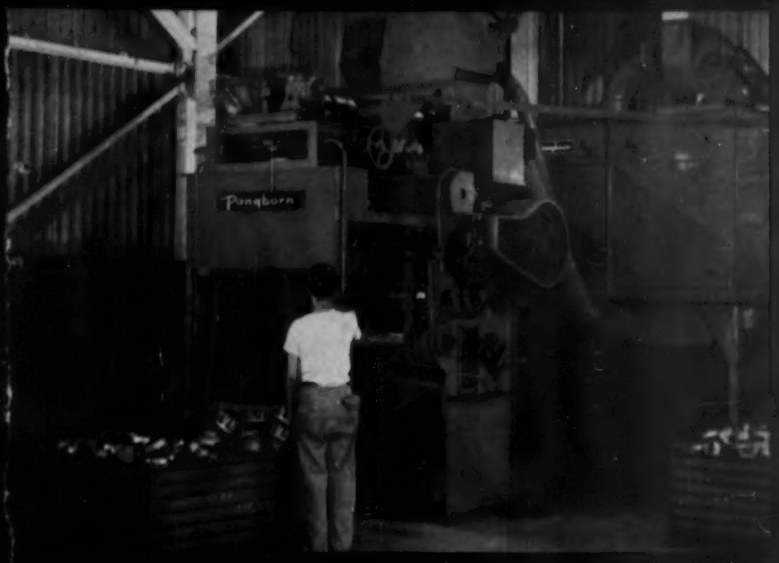

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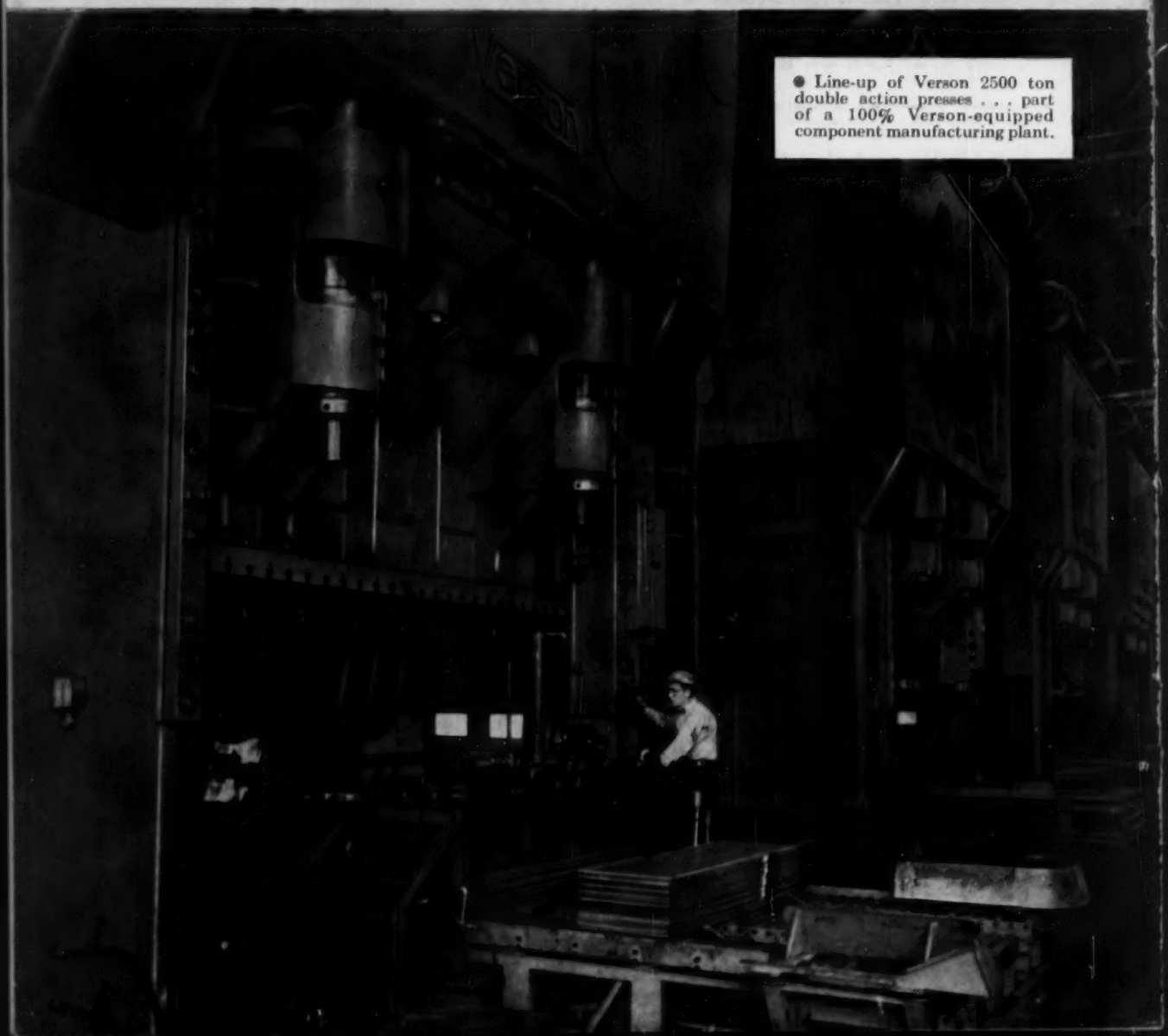

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